DOCUMENT RESUME

ED 433 246 SE 062 797

TITLE	Women, Minorities, and Persons with Disabilities in Science and Engineering: 1998.
INSTITUTION	National Science Foundation, Arlington, VA.
REPORT NO	NSF-99-338
PUB DATE	1999-02-00
NOTE	397p.; Supersedes NSF-96-311, ED 402 192.
AVAILABLE FROM	National Science Foundation, 4201 Wilson Blvd., Arlington, VA 22230.
PUB TYPE	Numerical/Quantitative Data (110) -- Reports - Descriptive (141)
EDRS PRICE	MF01/PC16 Plus Postage.
DESCRIPTORS	*Disabilities; *Engineering; Engineering Education; *Females; Graduate Students; Higher Education; *Minority Groups; Science Education; *Scientists; Sociocultural Patterns; *Womens Education

ABSTRACT

Scientists and engineers play a vital role in the United States educational system, in industrial competition, and in the generation of new knowledge. A challenge for this country is to attract the best talent from all sources to science and engineering in order to stimulate creativity, innovation, and change; contribute to the advancement of science and engineering; and foster a scientifically literate population. Some groups--women, minorities, and persons with disabilities--traditionally have not been fully represented in science and engineering. This report, the ninth in a series of reports to Congress, the administration, and others who direct public policy, presents data on the participation of underrepresented groups in science and engineering. Factors important to success in science and engineering at the precollege, undergraduate, graduate, and actual employment levels are documented here. The data and analyses presented can be used to track progress, inform development of policies to increase participation in science and engineering, and evaluate the effectiveness of such policies. (CCM)

Women, Minorities, and Persons with Disabilities

in Science and Engineering: 1998

National Science Foundation

February 1999

FOREWORD

Scientists and engineers play a vital role in the U.S. educational system, in industrial competition, and in the generation of new knowledge. A challenge for our country is to attract the best talent from all sources to science and engineering to stimulate creativity, innovation, and change; contribute to the advancement of science and engineering; and foster a scientifically literate population. Different perspectives, talents, and experiences produce better ideas and ultimately better goods and services to meet the needs of increasingly diverse markets for products and services in the United States and abroad. Our Nation needs the most from its human resources. Indeed, we need the talents of all our citizens if science, mathematics, and engineering are to remain a hallmark of America's excellence. So vital is this to the National Science Foundation (NSF) that one of the strategic goals of NSF as outlined in the Government Performance and Results Act Strategic Plan FY 1997–2003 is to "strive for a diverse, globally oriented workforce of scientists and engineers." To ensure this outcome is achieved, a second strategic goal of NSF is to obtain improved achievement in mathematics and science skills needed by all Americans.

Some groups—women, minorities, and persons with disabilities—traditionally have not been fully represented in science and engineering. Although progress has been made in the achievement and participation of some of these groups, this progress has not been consistent, and full representation has not yet been achieved. This report, the ninth in a series of biennial reports to the Congress, the administration, and others who direct public policy, presents data on participation of underrepresented groups in science and engineering. It also documents factors important to success in science and engineering in precollege, undergraduate, and graduate education, and employment. The data and analyses presented here can be used to track progress, inform development of policies to increase participation in science and engineering, and evaluate the effectiveness of such policies.

Rita R. Colwell
Director

ACKNOWLEDGMENTS

This report was prepared by the Division of Science Resources Studies (SRS) of the National Science Foundation (NSF), under the direction of Jeanne E. Griffith, Director of SRS. Bennett I. Bertenthal, Assistant Director for Social, Behavioral, and Economic Sciences, and Alan R. Tupek, former Deputy Director, SRS, provided guidance and review. Preparation of the report was the responsibility of the Education and Human Resources Program under the direction of Mary A. Golladay, Program Director.

Joan Burrelli coordinated the preparation of the report, compiled data, and directed the production of the volume. Chapter 1 was written by Joan Burrelli; chapter 2 was written by Joan Burrelli and Susan Hill; chapter 3 was written under the guidance of Ann Lanier by John Daniel of Howard University and Terry Savage and Cheryl Dobbins of Basic Technologies International Corporation; chapter 4 was written by Carolyn Arena and Theodosia Jacobs; and chapter 5 was written by Joan Burrelli. Several SRS staff members, including Linda Hardy, Susan T. Hill, Jean M. Johnson, Rolf Lehming, Kelly Kang, Mark Regets, Carolyn Shettle, John Tsapogas, and R. Keith Wilkinson, provided data or helped with data gathering and interpretation. Catrice Jackson, Aristo Vinayak, and Jennifer Held prepared tables and charts. Administrative support was provided by Martha James and Julia Harriston of SRS. Editing and production were performed by Nina Whitnah, Marilyn Nelson, Nancy Bailey, and Christine James of Blue Pencil Group, Inc. Anne M. Houghton managed the editing and composition contracts and provided guidance for the production of the report. John Gawalt was responsible for making this publication available on the World Wide Web (http://www.nsf.gov/sbe/srs/stats.htm). Web design, programming, and HTML coding were performed by Kathy Barquin, Andy Black, Marjorie Silvernail, Jacquelyn Nguyen, Debbie Fleming, and De Vo of Compuware Corporation.

Special acknowledgment is due to NSF's Committee on Equal Opportunities in Science and Engineering (CEOSE) who provided comments on the report and Susan Kemnitzer who served as Executive Secretary of CEOSE during the preparation of this report.

The following members served on CEOSE during the preparation of this report:

Arturo Bronson, University of Texas, El Paso

Jeanette Brown, New Jersey Institute of Technology

George Castro, San Jose State University

Julius Chambers, North Carolina Central University

Lesia Crumpton, Mississippi State University

Betty Davidson, Boston Museum of Science

David Glover, Woods Hole Oceanographic Institution

Benjamin Hart, University of California, Davis

William M. Jackson, University of California, Davis

Eric Jolly, Educational Development Center, Inc.

Jane Butler Kahle, Miami University

Joe L. Martinez, Jr., University of Texas, San Antonio

Gary S. May, Georgia Institute of Technology

Carolyn W. Meyers, North Carolina A&T State University

Patti T. Ota, Lehigh University

Norberto Salinas, University of Kansas

Marilyn Suiter, American Geological Institute

Teresa A. Sullivan, University of Texas, Austin

William Yslas Velez, University of Arizona

Lydia Villa-Komaroff, Harvard Medical School

Margaret C. Werner-Washburne, University of New Mexico

Glen Wheless, Center for Coastal Physical Oceanography

Henry N. Williams, University of Maryland

H. David Wohlers, Truman State University

Beverly Wright, Wake Forest University

Contributors

The following people provided data, allowed their research results to be presented, or assisted in obtaining data: Clifford Adelman, National Center for Education Statistics; Aurora D'Amico, National Center for Education Statistics; Mary Frank Fox, Georgia Institute of Technology; Arnold Goldstein, National Center for Education Statistics; Jerilee Grandy, Educational Testing Service; Vance Grant, National Center for Education Statistics; Sandra Hanson, Catholic University; Kelley Hayden, American College Testing Program; Robert Ibarra, University of Wisconsin; Cheryl Leggon, Wake Forest University; Andrew Malizio, National Center for Education Statistics; Mary McAfee, Colorado State University; John McNeil, Bureau of the Census; Michael Nettles, The College Fund/UNCF; George Nozicka, Quantum Research Corporation; Brian O'Reilly, College Board; Noel Perez-Rodriguez, University of Puerto Rico, Mayaguez; Ana Pineros, University of Puerto Rico, Resource Center for Science and Engineering; Elaine Seymour, University of Colorado; and John Sours, National Science Foundation. Their contributions are gratefully acknowledged.

Reviewers

The following are members of the review committee for this report: Carolyn Arena, Kelly Kang, Melissa Lane, Richard Morrison, Melissa Pollak, Mark Regets, Carolyn Shettle, and Patricia White of NSF; Catherine Didion of Association for Women in Science; Mary Frase of the National Center for Education Statistics; Catherine Gaddy of the Commission on Professionals in Science and Technology; Rhona Hartman of HEATH Resource Center, American Council on Education; Sharon Lynch of George Washington University; Willie Pearson, Jr., of Wake Forest University; Bonnie Robinson of the U.S. Environmental Protection Agency; Virginia Stern of the American Association for the Advancement of Science; and Ann Swanson of Sonoma State University. Steven Payson of NSF served as the facilitator of the review process.

In addition to the review committee, the following individuals reviewed and commented on the report: Arturo Bronson, University of Texas, El Paso; Ronald A. Nieman, Arizona State University; Robert Ibarra, University of Wisconsin, Madison; Gary S. May, Georgia Institute of Technology; Dorothy Miner, North Carolina State University; Christine Wise-Mohr, NSF; and Christine Sullivan, Chabot College.

Recommended Citation

National Science Foundation. *Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998.* Arlington, VA, 1999. (NSF 99-338)

CONTENTS

ABBREVIATIONS

ACT	American College Testing
ADA	Americans with Disabilities Act of 1990
AP	Advanced Placement
BIA	Bureau of Indian Affairs
GRE	Graduate Record Examination
HBCU	Historically Black College or University
HEGIS	Higher Education General Information Survey
IPEDS	Integrated Postsecondary Education Data System
NAEP	National Assessment of Educational Progress
NCES	National Center for Education Statistics, U.S. Department of Education
NIH	National Institutes of Health
NPSAS	National Postsecondary Student Aid Study
NSF	National Science Foundation
PSAT	Preliminary SAT
R&D	research and development
S&E	science and engineering
SAT	Scholastic Assessment Test
SDR	Survey of Doctorate Recipients
SED	Survey of Earned Doctorates
SIPP	Survey of Income and Program Participation
SME	science, mathematics, and engineering
SRS	Division of Science Resources Studies, National Science Foundation
SESTAT	Scientist and Engineer Statistics Data System

Women

- Female students are similar to males in completion of high school mathematics courses, according to the 1994 National Education Longitudinal Study Transcripts. More than half of both male and female high school graduates in 1992 had taken algebra I, algebra II, and geometry, but far fewer had taken trigonometry and calculus in high school. Nevertheless, the same percentages of male and female students had taken these advanced courses: about 17 percent of both male and female graduates had taken trigonometry, 9 percent of both had taken calculus, and 7 percent of both had taken advanced placement calculus. The proportion of both male and female high school graduates who took each of these mathematics courses increased from 1982 to 1994.
- Male and female high school graduates were also similar in science course taking in 1994. Female students were slightly more likely than males to have taken biology and chemistry, and males were slightly more likely than females to have taken physics: most students, more than 90 percent, had taken biology, slightly more than half had taken chemistry, and about one-fourth had taken physics. A larger proportion of both male and female high school students in 1994 took biology, chemistry, and physics than did 1982 graduates.
- Results of the 1996 National Assessment of Educational Progress (NAEP) mathematics assessment[1] showed that the gender gap in mathematics achievement has, for the most part, disappeared. Previous NAEP mathematics assessments showed that males scored higher than females in grade 12, but in 1996, average mathematics scores for males and females in 8th and 12th grade were not significantly different.[2] Among 4th graders, the average mathematics score for male students was slightly higher than that of female students.
- Among 12th graders, female students scored slightly lower than male students on the 1996 NAEP science assessment (152 for males and 148 for females). The difference in males' and females' science scores at grades 4 and 8 are not statistically significant.
- An examination of Scholastic Assessment Test (SAT) mathematics test scores for only the students who reported taking the highest level of mathematics (calculus) and science (physics) showed that women scored lower on average than men. Among those who took calculus, women averaged 594 and men 631 on the SAT mathematics; this difference—of 37 points—is similar to that for men and women test takers in general (35-point difference). Among those who took physics, women averaged 542 and men 577—a 35-point gap.
- From the SAT and ACT student data, it is clear that a larger number of women than men who choose to take college entrance tests are from lower income families. Although the proportions of test takers from the higher family income groups were about evenly split between males and females, among the lowest income groups, women accounted for more than 60 percent of the test takers. Given that parental income is related to average scores, then the higher proportion of women test takers who are from lower income families would reduce the averages for women test takers in general.
- The number of science and engineering doctorate degrees awarded to women increased 69 percent over the 10-year period, from

[1] The National Assessment of Educational Progress (NAEP), funded by the National Center for Education Statistics in the U.S. Department of Education, is designed to determine the achievement levels of precollege students in a number of areas, including mathematics and science, and to measure changes in achievement over time. Both mathematics and science assessments are administered periodically to students in the 4th, 8th, and 12th grades. National results are reported by NAEP for each grade level and within various subgroups (e.g., males and females, racial/ethnic groups).

[2] Here, as elsewhere in the report, tests of significance are calculated at the 0.5 level.

4,891 in 1985 to 8,273 in 1995. The *proportion* of total science and engineering doctoral degrees that were awarded to women increased from 26 percent of total science and engineering degrees in 1985 to 31 percent in 1995.

- Women received a minority of science and engineering doctorates in all fields except psychology. The proportion of women receiving the doctorate in psychology rose from 51 percent in 1985 to 64 percent in 1995. Women received 38 percent of all social science doctoral degrees awarded in 1995, but their participation within the various social science disciplines varied. For example, women received 24 percent of the economics degrees, but they received 58 percent of all the anthropology doctoral degrees and 53 percent of the sociology degrees.
- Women constitute 51 percent of the U.S. population, 46 percent of the U.S. labor force,[3] and 22 percent of scientists and engineers in the labor force. The lesser representation in science and engineering compared to the labor force as a whole can be explained in part by their more recent entry into science and engineering as well as a slightly greater tendency of women trained in science and engineering to be employed outside of science and engineering.[4]
- Among those in the labor force, unemployment rates of men and women scientists and engineers are similar: 2.0 percent of women and 2.2 percent of men were unemployed in 1995.
- Among all scientists and engineers in academic employment, women are more likely than men to be employed in elementary or secondary schools (11 percent versus 4 percent) and in 2-year colleges (12 percent versus 9 percent).
- In 4-year colleges and universities, women scientists and engineers hold fewer high-ranked positions than men. Women are less likely than men to be full professors, and are more likely than men to be assistant professors or instructors. Among ranked science and engineering faculty, 49 percent of men and 24 percent of women are full professors. Part of this difference in rank can be explained by age differences, but differences in rank remain even after controlling for age. Among those ages 45 to 54, 40 percent of women and 61 percent of men are full professors.[5]
- Women are also less likely than men to be tenured. Thirty-five percent of full-time employed women science and engineering faculty are tenured, compared to 59 percent of men. Some, but not all, of the differences in tenure may be attributable to differences in age. Among full-time employed science and engineering faculty ages 45 to 54, 57 percent of women and 76 percent of men are tenured.[5]
- Although roughly the same proportion of men and women had no publications (17 percent of women and 18 percent of men), women faculty had, on average, fewer publications in refereed journals since 1990 than men. Among doctoral scientists and engineers who were employed full time in colleges or universities and who received their doctorates in 1990 or earlier, 45 percent of women and 34 percent of men had 1 to 5 publications, and 38 percent of women and 48 percent of men had more than 5 publications since 1990.
- Differences in research support do not appear to be a factor in differences in publications. Women faculty are as likely as men to be supported on Federal contracts or grants—44 percent of women and 45 percent of men faculty were supported by Federal contracts or grants.
- Women are less likely than men to engage in managerial activity—22 percent of men and 18 percent of women cite management or administration as their primary work activity. Among those of similar ages, even less difference in managerial status is evident. Among scientists and engineers between the ages of 35 and 44, 19 percent of women and 21 percent of men are managers or administrators. Differences in field are also related to differences in primary work activities. For example, men are more likely than women to be engineers and physical scientists and are thus more likely to be engaged in research and development.

[3] The labor force referred to here consists of civilians who are 20 years old or older who are either employed or actively seeking employment.

[4] The science and engineering field in which women earn their degrees influences participation in the science and engineering labor force. A large proportion of women earn degrees in the social sciences, which are defined by NSF as science and engineering, and are then employed in social services occupations, e.g., social worker, clinical psychologist, which are defined by NSF as non–science-and-engineering occupations.

[5] Differences in field, time since degree and number of publications are likely to explain an additional portion of the differences.

- Although men and women scientists and engineers of similar ages are about equally likely to be managers, men are more likely than women to be high-level managers. Women who are supervisors have, on average, fewer subordinates (direct plus indirect) than men. Women supervisors have, on average, 8 direct and indirect subordinates; men have 12. This disparity in number of subordinates holds true among age groups as well.
- Full-time employed women scientists and engineers generally earn less than men, but differences in salary by gender are due primarily to differences in age and field. Women scientists and engineers are younger, on average, than men and are less likely than men to be in computer science or engineering, fields that command higher salaries. The overall median salary for women ($42,000) is much lower than that for men ($52,000), but within fields and within younger age categories the salaries of men and women differ much less. For example, among computer and mathematical scientists with bachelor's degrees between the ages of 20 and 29, the median salary for women was $35,000 and for men it was $38,000 in 1995. With increasing age, however, the gap in salaries of men and women widens.

Minorities[6]

- Although substantial differences in course taking by racial/ethnic groups remain, the percentages of black, Hispanic, and American Indian students taking many basic and advanced mathematics courses doubled between 1982 and 1994. For example, in 1982, 22 percent of black high school graduates had taken algebra II. By 1994, 44 percent had taken this course.
- Racial/ethnic groups differ greatly in mathematics course taking. Black and Hispanic high school graduates in 1994 were far more likely than white and Asian students to have taken remedial mathematics courses. Thirty-one percent of black, 24 percent of Hispanic, and 35 percent of American Indian high school graduates, compared with about 15 percent of whites and Asians had taken remedial mathematics in high school.
- Significant differences in mathematics and science achievement by race/ethnicity remain. Average mathematics scores increased for all racial/ethnic groups since 1990, but differences between white students and black and Hispanic students have not significantly decreased. For example, among 12th graders in 1990, the average difference between white students' mathematics scores and those of black students was 33 points. In 1996, it was 31 points.[7] The average difference between white students' mathematics scores and those of Hispanic students was 25 points in 1990; in 1996, it was 24 points.
- College enrollment and degree attainment by minorities have been increasing. Although minority enrollment in undergraduate programs dropped in the early 1980s, it has been steadily increasing since 1984, both in numbers and as a percentage of total undergraduate enrollment. In 1984, underrepresented minorities were 14.6 percent of all undergraduate students; by 1994, they were 20.6 percent. Minority women account for more of the increase in enrollment than do minority men. More than half (59 percent) of minority undergraduate students are women, whereas less than half (44 percent) of white, non-Hispanic undergraduate students are women.
- Of the 325,135 U.S. citizen and permanent resident students enrolled in graduate science and engineering programs in 1995 (both full-time and part-time), 14 percent were minorities. Blacks (6 percent), American Indians (0.5 percent), and Hispanics (4 percent) continued to be underrepresented relative to their proportion in the population.
- Field choices of minority women in science and engineering are more similar to those of white women than they are to those of minority men. Higher proportions of women than men within each racial/ethnic group are in computer or mathematical sciences, life sciences, and social sciences and lower proportions are in engineering. Asian women differ from women in other racial/ethnic

[6] In accordance with Office of Management and Budget guidelines, the racial/ethnic groups described in this report will be identified as white, non-Hispanic; black, non-Hispanic; Hispanic; Asian or Pacific Islander; and American Indian or Alaskan native. In text and figure references, these groups will be referred to as white, black, Hispanic, Asian, and American Indian. In instances where data collection permits, subgroups of the Hispanic population will be identified by subgroup name. The term "minority" includes all groups other than white; "underrepresented minorities" includes three groups whose representation in science and engineering is less than their representation in the population: blacks, Hispanics, and American Indians.

[7] The National Assessment of Educational Progress measures mathematics achievement on a scale ranging from 0 to 500.

groups in that a relatively small proportion are in social sciences.

- With the exception of Asians, minorities are a small proportion of scientists and engineers in the United States. Asians were 10 percent of scientists and engineers in the United States in 1995, although they were 3 percent of the U.S. population. Blacks, Hispanics, and American Indians as a group were 6 percent of the total science and engineeringlabor force in 1995 and 23 percent of the U.S. population.[8] Blacks were 3 percent, Hispanics were 3 percent, and American Indians were less than 1 percent of scientists and engineers.
- In 1995, the unemployment rate of white scientists and engineers was significantly lower than that of other racial/ethnic groups. The unemployment rate for whites was 2.0 percent, compared with 2.8 percent for Hispanics, 2.4 percent for blacks, and 3.4 percent for Asians. The differences in unemployment rates were evident within specific fields of science and engineering, as well as for science and engineering as a whole.
- Racial and ethnic groups differ in employment sector, partly because of differences in field. Among employed scientists and engineers in 1995, 51 percent of black, 57 percent of Hispanic, 64 percent of Asian, and 62 percent of white scientists and engineers were employed in for-profit business or industry. Blacks and American Indians are concentrated in the social sciences, which are less likely to offer employment in business or industry, and are underrepresented in engineering, which is more likely to offer employment in business or industry. Asians, on the other hand, are overrepresented in engineering, and thus are more likely to be employed by private for-profit employers.
- Black, Hispanic, and Asian faculty are less likely than white faculty to be full professors or to be tenured. Some, but not all, of the differences in rank and tenure are related to age differences. Black, Hispanic, and Asian scientists and engineers are younger on average than white and American Indian scientists and engineers. When age differences are accounted for, differences in rank and tenure are reduced. For example, among ranked faculty between the ages of 45 and 54, 50 percent of Hispanic faculty, 55 percent of Asian faculty, and 59 percent of white faculty were full professors. Among black faculty in that age group, however, 25 percent were full professors.
- Black science and engineering faculty had, on average, fewer publications since 1990 than did science and engineering faculty in other racial/ethnic groups. Among scientists and engineers who received their doctorates in 1990 or earlier and who work in 4-year colleges or universities, 29 percent of black faculty had no publications since 1990 compared with 14 percent of Hispanic, 12 percent of white, and 8 percent of Asian faculty.
- Black and American Indian faculty are also less likely than other groups to have Federal grants or contracts. Thirty-five percent of black and 25 percent of American Indian doctoral scientists and engineers employed in colleges or universities are supported by Federal contracts or grants compared to 45 percent of all doctoral scientists and engineers employed full time in colleges or universities.
- Asians are less likely than other groups to be in management or administration (14 percent of Asians compared with roughly 22 percent of Hispanic, white, and black scientists and engineers). Age differences do not explain this difference in managerial activity. Among 35 to 44 year olds, Asians remain less likely to be in management—13 percent of Asians and between 20 and 23 percent of other groups are in management or administration.
- Salaries for scientists and engineers differ little among racial/ethnic groups. Among all scientists and engineers, the median salaries by racial/ethnic group are $50,500 for whites, $50,000 for Asians, $45,000 for blacks, $47,000 for Hispanics, and $48,000 for American Indians. Within fields and age categories, median salaries of scientists and engineers by race/ethnicity are not dramatically different and do not follow a consistent pattern.
- Black and Asian women scientists and engineers are more likely than women from other racial/ethnic groups to be in the labor force and to be employed full time in a field related

[8] The science and engineering field in which blacks, Hispanics, and American Indians earn their degrees influences their participation in the science and engineering labor force. Blacks, Hispanics, and American Indians are disproportionately likely to earn bachelor's degrees in the social sciences, which are defined by NSF as science degrees, and then employed in social service occupations, e.g., social worker, clinical psychologist, which are defined by NSF as non–science-and-engineering occupations. See appendix A for the definitions of science and engineering occupations.

to their degree. Seventy-one percent of black and 72 percent of Asian women scientists and engineers compared with 61 percent of white, 68 percent of Hispanic, and 65 percent of American Indian women scientists and engineers were employed full time in their field.

- Median annual salaries of minority women are more similar to those of both white women and minority men after controlling for field and age. Among engineers in the 20- to 29-year-old age group, for example, the median salary of Hispanic women was $40,000, for black women $42,000, for Asian women $37,700, and for white women $38,800. Median salaries for men engineers in the same age group ranged from $38,000 to $40,000.

Persons With Disabilities

- Students with disabilities take fewer science and mathematics courses and have lower grades and lower achievement scores than students without disabilities. Students with disabilities are also more likely to drop out of high school than students without disabilities.
- About 5 percent of students taking the SAT, or more than 40,000, checked one of the categories indicating a disability; the ACT also had 5 percent of students (almost 20,000) who indicated a disability category in 1996.
- Among SAT test takers, almost 20,000 students took the test under nonstandard conditions. These test takers had average scores (463 verbal and 452 mathematics) that were below that of the average of all test takers who indicated on the student questionnaire that they had a permanent disability (472 verbal and 468 mathematics).
- Although the number of persons with reported disabilities who received science and engineering doctorates in 1995 was very small, the total has been increasing rapidly: the 355 recipients in 1995 were a 78 percent increase from the 200 science and engineering doctorates in 1989. Persons reporting disabilities constituted 1.3 percent of all doctorate recipients in 1995, up from 0.9 percent of the total in 1989.
- The labor force participation rates of scientists and engineers with and without disabilities are quite different. Almost one-third of scientists and engineers with disabilities are out of the labor force, compared with 11 percent of those without disabilities. Although age accounts for some of the tendency for persons with disabilities to be out of the labor force (because of retirements), chronic illness or permanent disability is also a factor. The primary reason for not working for both persons with and without disabilities was retirement (76 percent versus 60 percent), but 21 percent of persons with disabilities and 2 percent of those without disabilities cited chronic illness or permanent disability.
- Faculty who have disabilities are more likely than those without disabilities to be full professors and to be tenured. The differences in rank and tenure are related to differences in age. Because incidence of disability increases with age, scientists and engineers with disabilities tend to be older and to have greater years of professional work experience than those without disabilities.
- Science and engineering faculty with disabilities are less likely to have publications than those without disabilities. Twenty-two percent of those with disabilities and 17 percent of those without disabilities had no publications since 1990. Faculty with disabilities had fewer publications than those without disabilities—43 percent of those with disabilities and 46 percent of those without disabilities had 6 or more publications since 1990. Faculty with disabilities (38 percent) were also less likely than those without disabilities (45 percent) to have been supported on Federal grants or contracts.
- The type of work done by scientists and engineers with disabilities is similar to the type of work done by those without disabilities. The primary work activity of 37 percent of scientists and engineers with disabilities is research and development, compared with 38 percent of those without disabilities. Twenty-five percent of scientists and engineers with disabilities and 21 percent of those without disabilities are in management or administration. Among those with supervisory responsibilities, persons with and without disabilities have about the same number of subordinates (12 and 11, respectively).
- Median salaries of scientists and engineers with disabilities do not differ substantially from median salaries for those without disabilities. Among all scientists and engineers, the median salary for those with disabilities is $51,000; for those without disabilities it is $50,000. Salaries differ little within fields and age groups as well.

CHAPTER 1

INTRODUCTION

This report is the ninth in a series of Congressionally mandated biennial reports on the status of women and minorities in science and engineering. The primary purpose of this report is to serve as an information source on the participation of women, minorities, and persons with disabilities in science and engineering. It offers no endorsement or recommendations on policies or programs. The report documents both short- and long-term trends in the participation of women, minorities, and persons with disabilities in science and engineering education and employment.

Current data and historical trends from a number of National Science Foundation (NSF) surveys are reported, and also, where appropriate, findings from externally conducted research are cited. The report follows the chronological sequence of the educational system, then analyzes workforce participation.

Major Findings

Several major findings arise from an examination of data in this report.

- First, family income and education are related to the educational preparation and achievement of women and minority precollege students. For example, parental income is related to average scores on achievement tests. The higher proportion, in recent years, of women SAT test takers from lower income families could influence the average scores of women which tend to be lower on average than men's. Similarly, the higher proportion of minority achievement test takers from lower income families is related to lower average scores on these tests.
- Second, the number (and proportion) of women and minorities enrolling in and earning degrees in science and engineering is continuing to increase, whereas the number of white men doing so is decreasing.
- Third, access and accommodation continue to be crucial to participation of persons with disabilities in science and engineering. Although employed scientists and engineers with disabilities differ little from those without disabilities in field of employment, employment sector, primary work activity, and salary, persons with disabilities are underrepresented among those with degrees in science and engineering. Also, among those with degrees in science and engineering, they are underrepresented among persons employed in science and engineering.

Representation in Science and Engineering

Substantial gains have been made in the participation of women, minorities, and persons with disabilities in science and engineering in the last two decades. The gender gap in high school mathematics course taking has disappeared for the most part, and women are earning close to half of the bachelor's degrees in science and engineering. The employment experiences of women, minorities, and persons with disabilities in science and engineering are also improving. Unemployment rates no longer differ by sex, although differences remain among racial/ethnic groups and between those with and without disabilities. Salaries, controlling for field and length of experience, are similar across sex, race/ethnicity, and disability categories and the proportions of scientists and engineers in management within certain age categories are similar across sex, racial/ethnic, and disability categories. Despite similarities, widely different levels of participation exist within fields, degree levels, and sectors of employment.

Women

Women are approaching half of science and engineering bachelor's degree recipients. The proportion

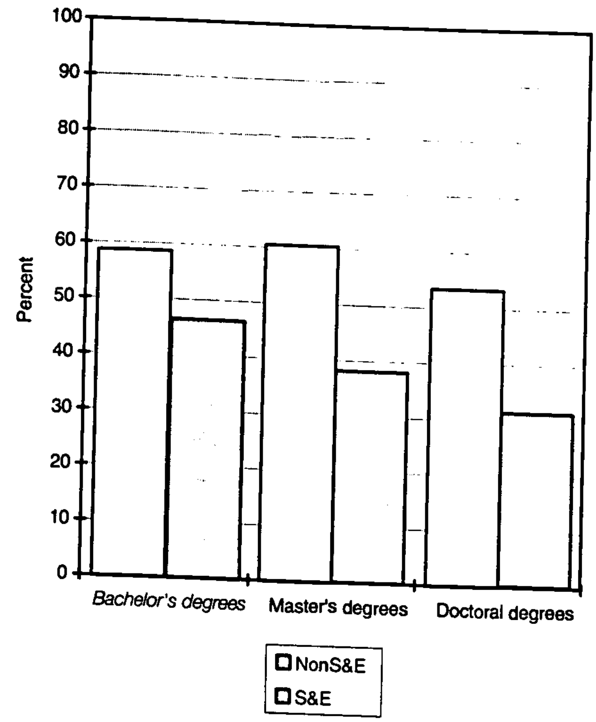
of bachelor's degrees in science and engineering awarded to women held fairly constant in the early to mid-1980s at 38 to 39 percent but has been steadily increasing since then, reaching 46 percent in 1995. (See appendix table 3-3.) Women have been more than half of bachelor's degree recipients in non–science-and-engineering fields since at least 1966 and were 59 percent of bachelor's degree recipients in non–science-and-engineering fields in 1995. Within science and engineering, some fields have a higher proportion of women than others. In 1995, women earned 73 percent of bachelor's degrees in psychology, 50 percent of bachelor's degrees in biological/agricultural sciences, and 50 percent of bachelor's degrees in social sciences. They earned about one-third of the bachelor's degrees in physical sciences; earth, atmospheric and ocean sciences; and in mathematical/computer sciences. They earned 17 percent of the bachelor's degrees in engineering.

Women earn a smaller proportion of master's and doctoral degrees in science and engineering than they do of bachelor's degrees. In 1995, women were 38 percent of master's degree recipients and 31 percent of doctorate recipients in science and engineering. (See appendix table 4-27.) By contrast, in non–science-and-engineering fields, women earn about the same proportion of advanced degrees as they do of bachelor's degrees. In 1995, women earned 59 percent of bachelor's degrees, 60 percent of master's degrees, and 53 percent of doctoral degrees in non–science-and-engineering fields. (See figure 1-1 and appendix table 4-28.)

Women constitute 46 percent of the U.S. labor force, and 22 percent of scientists and engineers in the labor force. (See appendix table 1-2 and text table 1-1.) The lesser representation in science and engineering compared to the labor force as a whole can be explained in part by their more recent entry into science and engineering and by the higher proportion of women than men with science and engineering degrees who are employed outside of science and engineering. The highest degree earned and the science and engineering field in which women earn their degrees influence participation in the science and engineering labor force. For example, a large proportion of women who earned bachelor's degrees in the social sciences, which are defined by NSF as science and engineering degrees, are then employed in social services occupations (for example, social worker, clinical psychologist).[1]

[1] Social services occupations are defined in NSF surveys as non–science-and-engineering occupations.

Figure 1-1.
Percentage of degrees in science and engineering and in non–science-and-engineering fields to women, by level of degree: 1995



See appendix tables 4-27 and 4-28.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Minorities[2]

Blacks, Hispanics, and American Indians are less likely than whites to participate in higher education whether in science and engineering or in non–science-and-engineering fields. Although blacks, Hispanics, and American Indians as a group are 23 percent of the U.S. population, they are 21 percent of college enrollment, 14 percent of non–science-and-engineering bachelor's degree recipients and 13 percent of science and engineering bachelor's degree recipients. (See text table 1-1 and appendix tables 1-1, 3-1, and 3-7.)

College enrollment and degree attainment by blacks, Hispanics and American Indians has been increasing. Minority enrollment has been steadily increasing since

[2] The term "minority" includes all groups other than white; "underrepresented minorities" includes three groups whose representation in science and engineering is less than their representation in the population: blacks, Hispanics, and American Indians. In accordance with Office of Management and Budget guidelines, the racial/ethnic groups described in this report will be identified as white, non-Hispanic; black, non-Hispanic; Hispanic; Asian or Pacific Islander; and American Indian or Alaskan native. In text and figure references, these groups will be referred to as white, black, Hispanic, Asian, and American Indian. In instances where data collection permits, subgroups of the Hispanic population will be identified by subgroup name.

Text table 1-1.
Selected indicators of participation in science and engineering, by sex, race/ethnicity, and disability status; 1995

Dash indicates not available.

Sex and race/ethnicity	Resident population of U.S. [1]	BA/BS degrees in nonS&E [2]	BA/BS degrees in S&E [2]	S&E graduate school enrollment [3]	PhD degrees in S&E [4]	U.S. labor force [5]	S&E labor force [6]
All races	100%	100%	100%	100%	100%	100%	100%
Men	48.9	40.4	53.5	58.6	63.7	54.1	77.6
Women	51.1	59.6	46.5	41.4	36.3	45.9	22.4
White, not Hispanic	73.5	79.5	76.6	75.9	73.2	84.6	83.8
Men	35.9	32.6	42.0	45.1	45.7	46.3	65.6
Women	37.6	46.9	34.6	30.8	27.5	38.3	18.2
Asian	3.4	4.0	7.6	8.0	19.3	—	9.7
Men	1.6	1.6	4.2	5.1	13.5	—	7.5
Women	1.7	2.4	3.4	2.9	5.8	—	2.2
Black, not Hispanic	12.0	7.7	7.1	5.6	2.9	11.2	3.4
Men	5.7	2.6	2.9	2.5	1.5	5.4	2.1
Women	6.3	5.0	4.3	3.1	1.4	5.8	1.3
Hispanic	10.4	5.9	5.8	4.3	3.0	9.2	2.8
Men	5.3	2.2	2.9	2.3	1.8	5.5	2.2
Women	5.1	3.7	2.9	2.1	1.2	3.6	0.7
American Indian	0.7	0.6	0.6	0.5	0.4	—	0.2
Men	0.4	0.2	0.3	0.2	0.2	—	0.2
Women	0.4	0.4	0.3	0.2	0.1	—	0.1
Persons with disabilities	20.6	—	—	—	1.3	13.9	4.9
Men	9.7	—	—	—	0.9	7.6	3.9
Women	10.9	—	—	—	0.4	6.4	1.0
Persons without disabilities	79.4	—	—	—	98.7	86.1	95.1
Men	39.2	—	—	—	67.9	46.5	73.7
Women	40.2	—	—	—	30.7	39.6	21.4

[1] Sources: U.S. Bureau of the Census, Population Division, Release PPL-57. *United States Population Estimates, by Age, Sex, Race, and Hispanic Origin, 1990 to 1996*. Data by disability status are from the Census' 1994 Survey of Income and Program Participation.

[2] Figures are for U.S. citizens and permanent residents only. Total includes persons with unknown race/ethnicity. Source: Tabulations by National Science Foundation/SRS; data from National Center for Education Statistics IPEDS Completions Survey, 1995.

[3] Figures are for U.S. citizens and permanent residents only. Source: National Science Foundation, Survey of Graduate Students and Postdoctorates in Science and Engineering, 1995.

[4] Figures by race and sex are for U.S. citizens and permanent residents only. Source: National Science Foundation, Survey of Earned Doctorates, 1995.

[5] Source: U.S. Department of Commerce, Bureau of the Census, 1995, Current Population Reports. Details will not add to totals because data for "other races" group are not presented and Hispanics include both white and black population groups. Data by disability status are for persons age 15 to 64, are from the Census' 1994 Survey of Income and Program Participation and refer to employed persons rather than persons in the labor force.

[6] Source: National Science Foundation, SESTAT data system, 1995. Data by disability status refer to employment rather than participation in the labor force.

NOTE: Because of rounding, details may not add to totals.

1990, both in numbers and as a percentage of total enrollment. In 1990, underrepresented minorities were 17 percent of all undergraduate students; by 1994, they were 21 percent. (See appendix table 3-7.) Minority women are a larger percentage of undergraduate students than are minority men. Underrepresented minority women constituted 12 percent of total undergraduate enrollment in 1994 whereas underrepresented minority men constituted 8 percent.

Both the number and proportion of degrees in science and engineering earned by minorities increased since 1990. By 1995, blacks earned 7 percent of science and engineering bachelor's degrees to U.S. citizens and permanent residents, up from 5 percent in 1985; Hispanics earned 6 percent, up from 4 percent; and American Indians earned 0.6 percent, up from 0.4 percent.[3] (See appendix table 3-1.) A higher proportion of bachelor's degrees in science and engineering to blacks, Hispanics, and American Indians were earned in social science (38 percent) and in psychology (21 percent) than was the case for other groups: 34 percent of those earned by whites and 24 percent of those earned by Asians were in social science and 19 percent of those earned by whites and 11 percent of those earned by Asians were in psychology.

Underrepresented minorities as a whole are 6 percent of the science and engineering labor force. Asians are 10 percent of the science and engineering labor force. (See text table 1-1.)

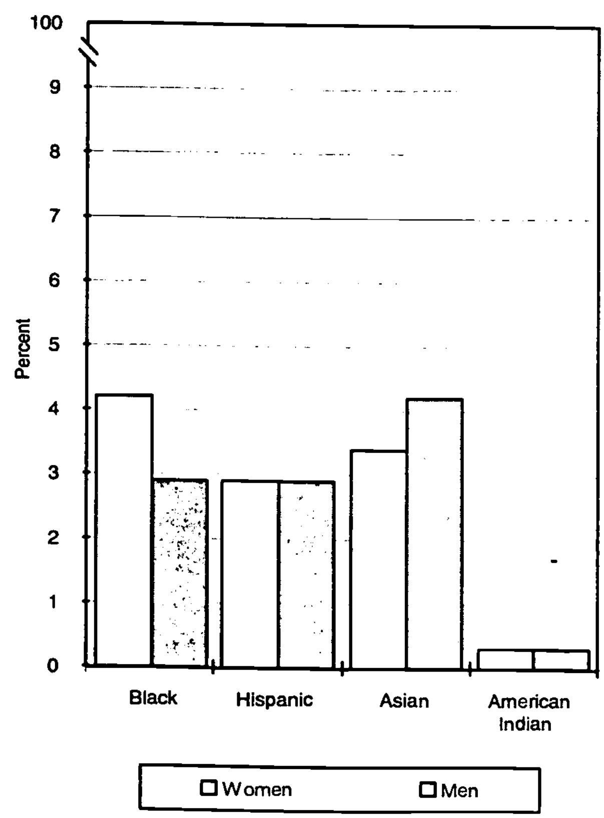
Minority Women

Minority women are as well represented among science and engineering bachelor's degree recipients as minority men, for the most part. Black women are more likely than black men to earn bachelor's degrees, whether in science and engineering or in other fields. Black women were 4.3 percent of science and engineering and 5.0 percent of non–science-and-engineering bachelor's degree recipients in 1995; black men were 2.9 percent and 2.6 percent, respectively. (See figure 1-2.) The same proportion of bachelor's degrees in science and engineering were earned by Hispanic women and Hispanic men (2.9 percent) in 1995. Likewise, the same proportion of American Indian women and American Indian men (0.3 percent) earned bachelor's degrees in science and engineering in 1995. Asian women were a slightly smaller proportion (3.4 percent) of bachelor's degree recipients in science and engineering than were Asian men (4.2 percent).

As is the case for minority men, black, Hispanic, and American Indian women are less represented among bachelor's degree recipients, whether science and engineering, or non–science-and-engineering, than they are among the population as a whole. As a group, they were 12 percent of the population, 9 percent of non–science-and-engineering bachelor's degree recipients, and 7 percent of science and engineering bachelor's degree recipients in 1995. Asian women, however, were 2.4 percent of non–science-and-engineering and 3.4 percent of science and engineering bachelor's degree recipients and were 1.7 percent of the population. (See text table 1-1.)

Black, Hispanic, and American Indian women are less represented among science and engineering doctoral degree recipients than are minority men. As a group, they earned 2.8 percent of science and engineering doctorate degrees to U.S. citizens and permanent residents in 1995. (See appendix table 4-40.) Black, Hispanic, and American Indian men are 3.5 percent of science and engineering doctorate recipients. Asian women are a higher proportion of science and engineering doctorate recipients than they are of bachelor's degree recipients, but are less likely than Asian men to earn doctoral degrees in science and engineering.

Figure 1-2.
Percentage of bachelor's degrees in science and engineering and in non–science-and-engineering fields to men and women, by race/ethnicity: 1995



See appendix tables 3-17, 3-18, and 3-19.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

[3] U.S. citizens and permanent residents only.

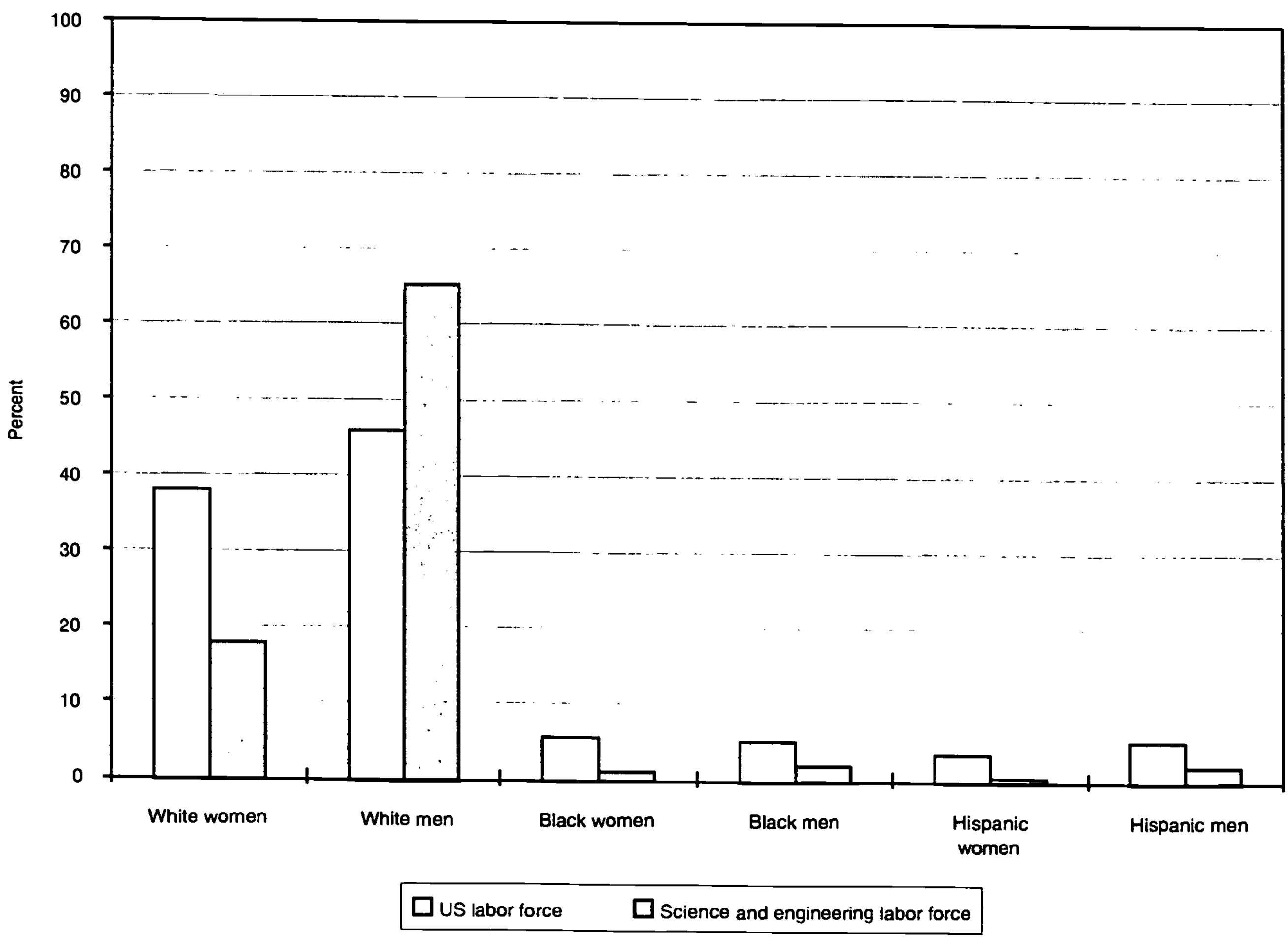
Minority women (including Asians) are 19 percent of all women in the science and engineering labor force and 4 percent of all scientists and engineers in the labor force. (See text table 1-1 and appendix table 5-22.) Within every racial/ethnic group, women are a smaller proportion of the science and engineering labor force than are men. (See figure 1-3.) Field of degree results in differences in employment statistics, as will be discussed in chapter 5.

Field choices of minority women are more similar to those of white women than to those of minority men. Smaller proportions of black and Hispanic women than of black and Hispanic men are in engineering, and higher proportions are in the broad fields of computer/mathematical sciences and social sciences. Asian women are more likely than other women to be engineers and less likely than other women to be social scientists. (See appendix table 5-22.)

Persons With Disabilities

Data on participation of persons with disabilities are less available than data on other groups. These data are seriously limited for several reasons. First, there have been differing operational definitions of "disability" that include a wide range of physical and mental conditions. Different sets of data have used different definitions and thus are not totally comparable. Second, data about disabilities are frequently not included in comprehensive institutional records (for example, in registrars' records in institutions of higher education). Concerns about confidentiality often inhibit collection or dissemination by institutions of data on disabilities. The third limitation on information on persons with disabilities gathered from surveys is that it often is obtained from self-reported responses. Typically, respondents are asked if they have a disability and to specify what kind of disability it is. Resulting

Figure 1-3.
Percentage of the U.S. civilian labor force and the science and engineering labor force, by sex and race/ethnicity: 1995



See appendix tables 1-2 and 5-22.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

data, therefore, reflect individual decisions to self-identify, not objective measures.

Although NSF collects data on persons with disabilities in most of its surveys and uses common definitions among its surveys, these surveys cover people who earn doctoral degrees in science and engineering or who are employed in science and engineering. NSF does not collect data on precollege education or undergraduate education. The National Center for Education Statistics of the Department of Education does collect data on those levels of education, but in most instances does not include measures of disability status. For example, colleges and universities do not maintain data on students with disabilities. Therefore, enrollment and degree data collected from colleges and universities are not reported by disability status.

Estimates of the proportion of the population with disabilities vary greatly. About 20 percent of the population have some form of disability, with about 10 percent of the population having a severe disability.[4] (See appendix table 1-3.) These disabilities may or may not require accommodation or limit an individual's ability to participate in educational experiences or to be productive in an occupation; these factors account for some of the variability in estimates of the size of this population.[5]

Persons with disabilities are underrepresented in the workforce and in the science and engineering workforce. Persons with disabilities were 13.9 percent of employed persons in 1994 and 4.9 percent of employed scientists and engineers in 1995.[6] (See text table

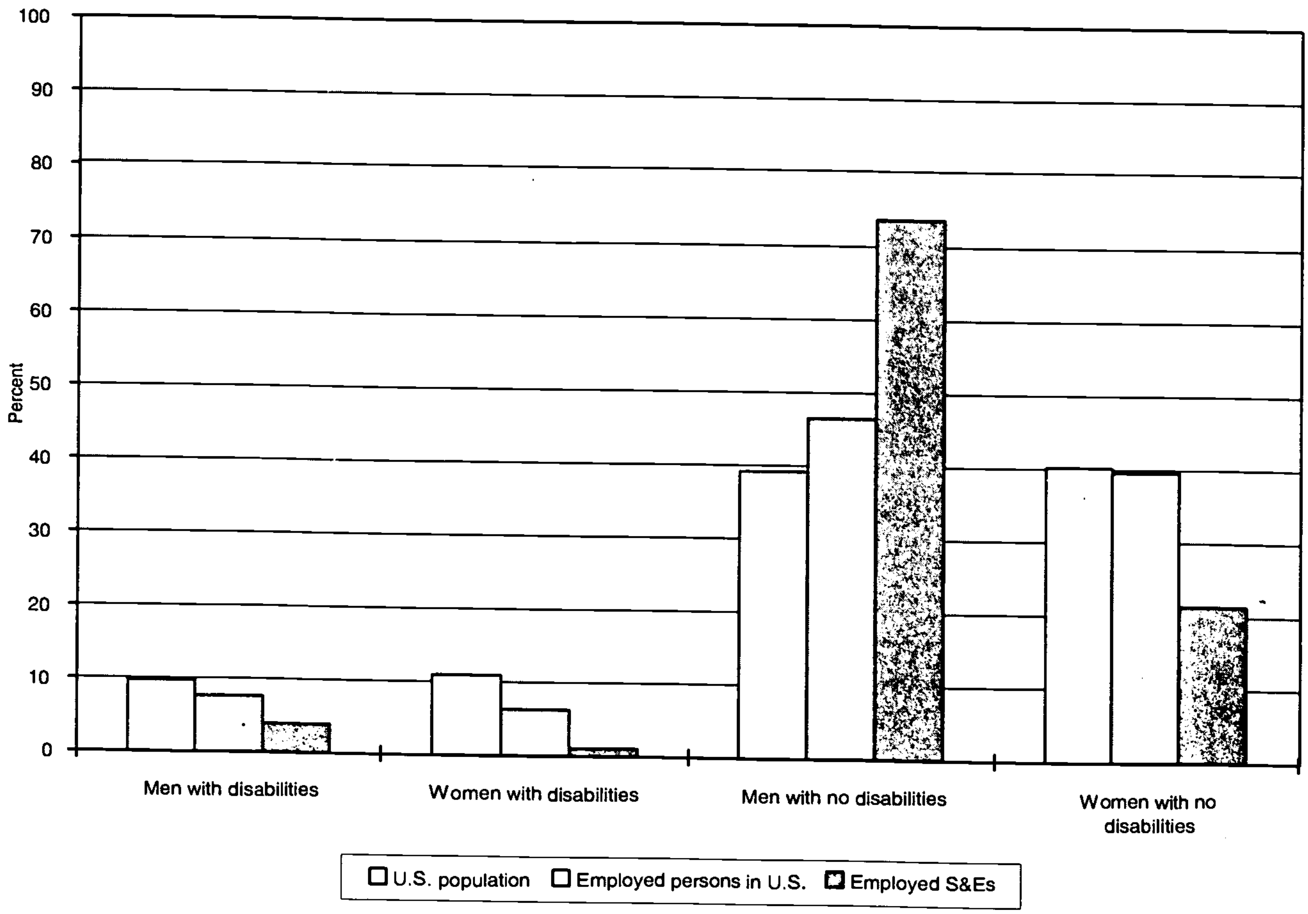
[4] Estimates of the proportion of the population with disabilities vary due to differing definitions of "disability." See the technical notes in appendix A for a discussion of the limitations of estimates of the size of this group.

[5] For a discussion of the data problems in describing the population with disabilities, see McNeil (1993).

[6] The incidence of disability increases with age. More than half of doctoral scientists and engineers who indicate they have a disability became disabled at age 30 or later. See appendix table 5-29.

Figure 1-4.

Percentage of the U.S. population, employed persons in United States, and employed scientists and engineers, by sex and disability status: 1995



See appendix table 1-3 and text table 1-1.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

1-1 and appendix table 1-4.) Women with disabilities are less likely than men with disabilities to be employed and to be employed in science and engineering. (See figure 1-4 and appendix table 1-5.)

Data Sources

Data for this report come from a number of sources. (See appendix A, "Technical Notes.") The primary sources of information are surveys conducted by NSF's Division of Science Resources Studies. Other sources include surveys conducted by the Department of Education's National Center for Education Statistics (NCES).

Data on bachelor's and master's degrees come from the Integrated Postsecondary Education Data System's (IPEDS) Completions Survey, which is part of an integrated system of surveys conducted by the National Center for Education Statistics. This survey provides data on the number and types of degrees awarded by U.S. postsecondary institutions and data on the characteristics of degree recipients.

Graduate enrollment data come from NSF's Survey of Graduate Students and Postdoctorates in Science and Engineering. This survey provides data on the number and characteristics of graduate science and engineering students enrolled in U.S. institutions, differences in enrollment patterns, and differences in financial support patterns.

The Survey of Earned Doctorates is the source of data on doctoral degrees. This survey, which is conducted for the National Science Foundation, the National Institutes of Health, the National Endowment for the Humanities, the U.S. Department of Education, and the U.S. Department of Agriculture, annually provides data on the number and characteristics of individuals receiving research doctorate degrees[7] from U.S. institutions.

Employment data come primarily from three surveys that form an integrated system of NSF surveys called the Scientist and Engineer Statistics Data System (SESTAT) to produce national estimates of the entire science and engineering workforce. The Survey of Doctorate Recipients provides demographic and employment information on individuals with doctoral degrees in science and engineering. This survey is a longitudinal survey of a sample of individuals under the age of 76 who received a research doctorate in science or engineering from a U.S. institution and who were living in the United States. The National Survey of Recent College Graduates provides employment and demographic data on individuals who recently obtained bachelor's or master's degrees in science or engineering fields. The National Survey of College Graduates provides data on the number and characteristics of individuals with training and/or employment in science and engineering in the United States.

The "Technical Notes" found in appendix A present information on the underlying concepts, data collection techniques, reporting procedures, and statistical reliability of the primary data sources used in this report.

Statistical Reliability of Comparisons

The "Technical Notes" found in appendix A present information on the primary data sources used in this report. Many of the data sources used in this report are sample surveys. Information presented from sample surveys has differing degrees of reliability. Survey summaries may differ from the actual values for the population under study due to a number of sources contributing error to the estimates. This report states differences in comparisons of groups or in trends in the data over time only if they are greater than the differences that would be likely to result due to chance. (In statistical terms, for this report the impact of sampling error is accounted for by testing at the 95 percent confidence level any individual comparisons presented.) Where possible, analysts have also considered the impact of nonsampling errors such as incomplete coverage and nonresponse.

Organization of Report

Chapter 2 focuses on precollege mathematics and science education, including factors influencing science and mathematics achievement, course taking, test scores, and attitudes toward science and engineering.

Chapter 3 examines undergraduate education as preparation both for careers and for graduate education. This chapter presents data on trends in enrollments and degrees in 2- and 4-year colleges and universities and college course taking patterns.

Chapter 4 addresses graduate enrollment, degrees, and financial support. It presents data on trends in enrollments and degrees, primary source of support in graduate school, and time to completion of PhD.

Chapter 5 examines employment patterns including unemployment, full- and part-time employment, and employment by field and sector. It also focuses separately on academic and nonacademic employment.

References and Data Sources

McNeil, John M. 1993. *Americans With Disabilities, 1991–92: Data from the Survey of Income and Program Participation.* Bureau of the Census,

[7] Research doctorates are doctorates which require original research. These include most PhD, and some Ed.D. and D.Sc. degrees. Nonresearch doctorates and first-professional degrees such as the J.D., M.D., D.D.S., etc. are not included in the Survey of Earned Doctorates.

Current Population Reports, P70-33. Washington, DC: U.S. Department of Commerce.

National Science Foundation. 1997. *Science and Engineering Degrees: 1966–1995* (NSF 97-335). Arlington, VA: National Science Foundation.

National Science Foundation. 1997. *Science and Engineering Degrees, by Race Ethnicity: 1988–1995* (NSF 97-334). Arlington, VA: National Science Foundation.

Science and Engineering Equal Opportunities Act, Section 32(b), Part B of P.L. 96-516, 94 Stat. 3010, as amended by P.L. 99-159.

U.S. Department of Commerce, Bureau of the Census. 1994. *U.S. Population Estimates, by Age, Sex, Race, and Hispanic Origin, 1990 to 1996.* PPL-57. Washington, DC: U.S. Department of Commerce.

U.S. Department of Commerce, Bureau of the Census. 1995. Current Population Reports. Washington, DC: U.S. Department of Commerce.

CHAPTER 2

PRECOLLEGE EDUCATION

Overview

Precollege participation in science and mathematics influences participation of women, minorities, and persons with disabilities in science and engineering. Current and historical differences in science and mathematics course taking and scores on achievement tests influence current and future participation by these groups in postsecondary science and engineering education and employment.

This chapter examines (1) factors influencing achievement, (2) precollege science and mathematics course taking, (3) mathematics and science achievement test scores, (4) high school completion rates, and (5) college entrance examinations.

Influences on Mathematics and Science Achievement

Although gains have been made by women and minorities in mathematics and science achievement—as measured by elementary and secondary assessment test scores and by college entrance examinations—differences remain. These differences in achievement can then become a basis for unequal participation in further mathematics and science education, employment, and technological and science literacy. This section addresses factors that influence mathematics and science achievement—factors that account for both gains in achievement in some areas and persistent differences among groups in other areas. It should be noted that these factors influence the achievement of *all* students, regardless of sex, race/ethnicity, or disability status.

Mathematics and Science Course Taking

A primary factor contributing to mathematics and science achievement is mathematics and science course taking. Both the number and type of courses taken are positively related to achievement (Oakes, 1990; Peng, Wright, and Hill, 1995). One of the factors contributing to the increase in science and mathematics achievement test scores (as measured by the National Assessment of Educational Progress discussed on [illegible] 15) over time could be the increase in science and mathematics course taking (NSB, 1996). Differences in course taking by gender, race/ethnicity, and disability status, thus may contribute to differences among these groups in science and mathematics achievement.

Family Income and Education

Differences in mathematics and science achievement are also related to differences in family income and parents' education. Socioeconomic status (parental occupation, education, and income) accounts for a substantial amount of the differences in mathematics achievement (Ekstrom, Goertz, and Rock, 1988; Madigan, 1997). Students at grades 4, 8, and 12 whose parents had less than high school education scored lower in science and mathematics than students whose parents had higher levels of education. Similarly, those students eligible for the free or reduced price lunch program (an indicator of parental income) scored lower than those not eligible (Campbell et al., 1996). Poverty may explain some of the differences in females' and males' Scholastic Assessment Test (SAT) scores: a higher proportion of women than men SAT and American College Testing (ACT) test takers are from low-income families. Poverty may also explain some of the racial/ethnic differences in achievement test scores: blacks and Hispanics are more likely than whites and Asians to live in poverty. In 1995, poverty rates were 8.5 percent for non-Hispanic whites, 29.3 percent for blacks, 30.3 percent for Hispanics, and 14.6 percent for Asians (Baugher and Lamison-White, 1996). Further, children in poverty are more likely to have disabilities. Poverty is associated with health problems and learning disabilities: a higher proportion of children from low-income families than from higher income families are in special education because of developmental delays, learning disabilities, and emotional disturbances (U.S. Department of Education, 1997).

School Characteristics

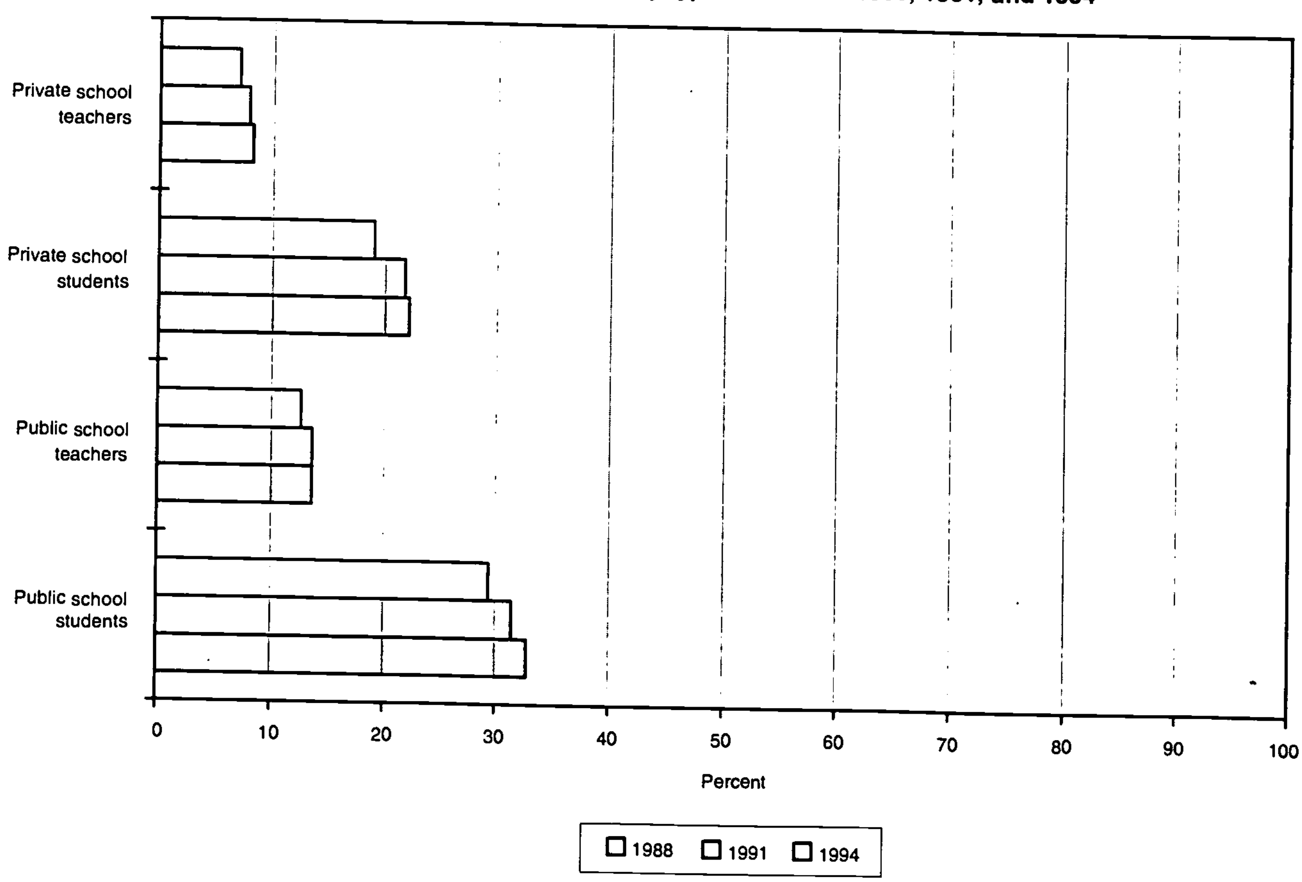
School characteristics contributing to unequal participation in science and mathematics education include

tracking, judgments about ability, number and quality of science and mathematics courses offered, access to qualified teachers, access to resources, curricula emphases (Oakes, 1990; Weiss, 1994; Madigan, 1997), and access to teachers and services that reduce language and cultural barriers (Laosa, 1997; Miller, 1997; Ponessa, 1997).

Lack of role models may also influence achievement. The proportion of minority (black, Hispanic, and Asian) students in elementary and secondary schools has increased in recent years from 28 percent in 1987–1988 to 32 percent in 1993–1994. (See appendix table 2-1.) In the 1993–1994 school year, black students constituted 16 percent; Hispanic students, 12 percent; and Asian students, 3 percent of all public and private elementary and secondary school students. The proportion of elementary and secondary teachers who are members of minority racial/ethnic groups was 12 percent in 1987–1988 and 13 percent in 1993–1994—still well below the proportion of minority students. (See figure 2-1 and appendix table 2-2.)

Classroom placement and accommodations are factors that influence the achievement of students with disabilities in addition to factors mentioned previously. Elementary and secondary students with disabilities have special needs that may hinder their ability to participate fully in science and mathematics instruction if accommodations are not made. Students with disabilities may be served in regular classrooms and be provided with special services via a resource room or receive instruction at a variety of special sites. Secondary students who spend more time in regular education and vocational classes have greater access to the general educational curriculum, higher expectations for performance, and more positive school outcomes (U.S. Department of Education, 1996 and 1997). During the past few years, the fraction of students served in regular classrooms has increased and the

Figure 2-1.
Percentage of students and teachers who are minority, by type of school: 1988, 1991, and 1994



NOTE: "Minority" includes Asians, Hispanics, blacks, and American Indians.

See appendix tables 2-1 and 2-2.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

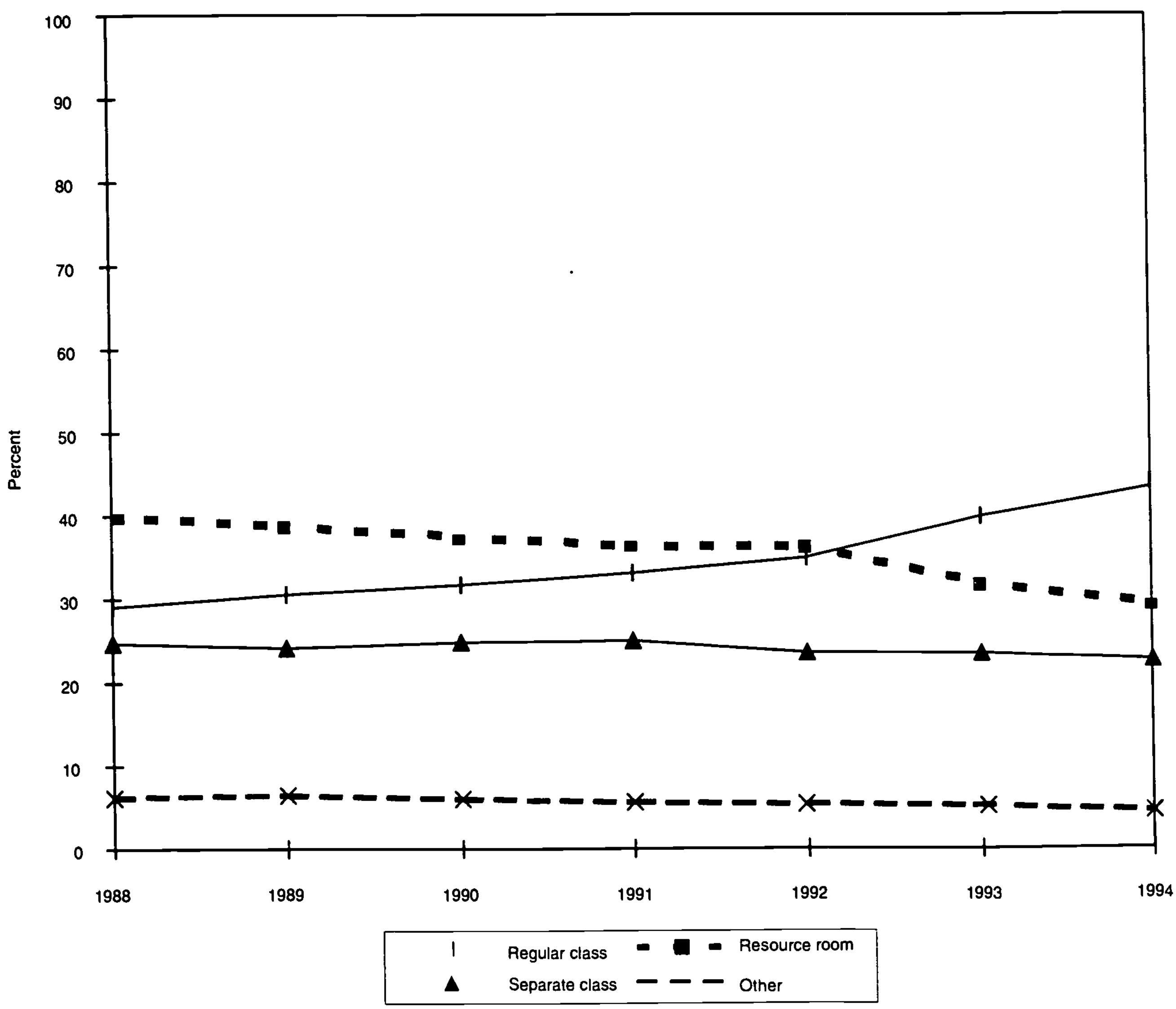
percentage served in resource rooms has decreased. (See figure 2-2.) In the 1993–1994 school year, 43 percent of all students receiving special education services were in regular classrooms (up from 29 percent in 1987–1988), 30 percent were in resource rooms, 23 percent in separate classes, 3 percent in separate schools, and less than 1 percent each in residential facilities or in homebound/hospital placements. (See appendix table 2-3.)

Placement patterns for students vary considerably depending on the type of disability. Students with speech and language impairments are most likely to attend regular classes: 88 percent are in regular classes. Students with learning disabilities, orthopedic impairments, serious emotional disturbance, and traumatic brain injury are more widely distributed in their placements within several settings—regular classes, resource rooms, and separate classes—within regular schools. (See appendix table 2-4.)

Technology in the classroom can also influence instruction of students with disabilities. Advances in technology (for example, closed captioning, personal computers, and Internet services) can allow students with disabilities to communicate and participate in

Figure 2-2.

Percentage of students ages 6 to 21 with disabilities by type of educational environment: 1988–1994



See appendix table 2-3.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Differences in Student Access to Technology

Students differ in their access to computer technology and in their use of computers, according to the report *Computers and Classrooms* (Coley, Cradler, and Engel, 1997). In general, students attending high-poverty and high-minority schools had less access to computer technology. These schools had fewer computers and multimedia computers per student than other schools and were less likely to have cable TV, access to the Internet, CD-ROM technology, and local area networks. Also, schools with high percentages of minorities were less likely to have satellite dishes. There were two exceptions to the general finding: high-poverty schools were more likely to have satellite dishes and the schools with low percentages of minority students were least likely to have videodisc players.[1]

The Educational Testing Service (ETS) study reported several differences among students in their computer-related coursework or experience (based on a 1996 College Board report on SAT program test takers). Females were slightly more likely than males to have experience in word processing and to use a computer in their English courses. Females were less likely than males to have experience in computer literacy, using computers to solve mathematics problems, and taking courses in computer programming. Blacks and Hispanics were less likely than whites to have experience in word processing, computer literacy, using computers in their English courses, and using computers to solve mathematics problems. Asians were more likely to have taken courses in computer programming.

[1] The data for access to the Internet are for fall 1996 and are reported in the NCES survey report: *Advanced Telecommunications in U.S. Public Elementary and Secondary Schools, Fall 1996*, U.S. Department of Education, National Center for Education Statistics, February 1997 (Heaviside, Riggins, and Farris, 1997). The rest are 1995–1996 data reported in *Technology in Public Schools, 15th Edition. Installed Base Technology in U.S. Public Schools, Covering 1981–1996*, 1997, Quality Education Data, Denver, CO (Quality Education Data, 1997).

classroom activities more on par with students who do not have disabilities. Efforts to increase accessibility to persons with disabilities often increases accessibility to others. For example, closed captioning, which was implemented for people who are deaf, is now being used by people learning English as a second language (National Research Council, 1997). Not all of these advances, however, will be accessible by all people in all situations.

Science and Mathematics Course Taking and Achievement

The number of courses taken in mathematics and science is an important indicator of preparation for undergraduate majors in science and engineering as well as of general scientific literacy and is, as we have seen, an important influence on mathematics and science achievement.

Women

Mathematics Course Taking

Female and male students are similar in completion of high school mathematics courses. More than half of both male and female high school graduates in 1994 had taken algebra II and geometry, but far fewer had taken trigonometry and calculus in high school. Nevertheless, the same percentages of male and female students had taken these advanced courses: 17 percent of male and 18 percent of female students had taken trigonometry, 9 percent of both had taken calculus, and 7 percent of both had taken advanced placement calculus. (See appendix table 2-5.)

Science Course Taking

Male and female high school students differed only slightly in science course taking in 1994. Female students were slightly more likely than males to have taken biology and chemistry, and males were slightly more likely than females to have taken physics: 92 percent of males and 95 percent of females had taken biology, 53 percent of males and 59 percent of females had taken chemistry, and 27 percent of males and 22 percent of females had taken physics. (See appendix table 2-5.) The increases in physics course taking from 1982 to 1994 were greater for females than for males. During that period, the proportion of male high school graduates who had taken physics increased 8 percentage points (from 19 percent to 27 percent) and the proportion of females who had taken physics increased 12 percentage points (from 10 percent to 22 percent).

Mathematics and Science Achievement

The National Assessment of Educational Progress (NAEP), funded by the National Center for Education Statistics in the U.S. Department of Education, is

Diversity Among Asian American High School Students

Although Asian Americans are often treated as a single group for statistical analysis, a recent report (Kim, 1997) found many differences in educational and family background among Asian American high school seniors depending on whether they were Chinese, Filipinos, Koreans, Japanese, Southeast Asians, or South Asians.[2] Differences were also found between native-born and foreign-born Asian Americans. Data for the report were drawn from the Second Follow-up Survey of the 1988 National Education Longitudinal Study (NELS:88).[3]

The author of the report, Heather Kim, argues that even though stereotypes of Asian Americans may be largely favorable, they still can be harmful. For example, because there is a widespread belief that Asian Americans are strong academically, there may not be sufficient effort to provide help for those groups of Asian Americans that are less highly educated. She states, "The myth of them all being educational high achievers has kept many from needed student services and support."

In some respects, the six groups of Asian Americans were fairly similar to one another. Nearly all believed that getting a good education was important in their lives. Three-fourths or more of the parents expected their child to earn a college degree or higher.

Parents of South Asian students had the highest occupational status and educational expectations for their children of any of the groups. The South Asian students themselves tended to have the highest educational aspirations, to be more involved in extracurricular activities, and to perform the best on the National Assessment of Educational Progress (NAEP) standardized tests in reading and (to a lesser degree) mathematics. By contrast, the parents of Southeast Asians were the least likely to have a college education and had the lowest occupational status on average. The Southeast Asian students tended to have the lowest educational aspirations, to be least likely to participate in extracurricular activities, and to receive the lowest scores on the NAEP standardized tests.

Native-born seniors tended to have greater educational advantages than foreign-born seniors. Their parents generally had achieved higher educational levels and higher status occupations. Native-born seniors on average spent more time on extracurricular activities than foreign-born seniors but less time on homework. Native-born seniors did better on the NAEP standardized test on reading, but about the same as their foreign-born peers on mathematics.

The ethnicity of Asian Americans and their likelihood of being native born are interrelated. Chinese immigration started earliest (about 1840), followed by the Japanese (between 1890 and 1920), and Korean (about 1903). Thus, among these groups one can expect to find substantial groups of native-born students. By contrast, Southeast Asians are more likely than other groups to be foreign born.

Aside from her use of the NELS data, Kim also cites other statistics concerning the disadvantages facing some Asian ethnic groups. These include high school dropout rates around 50 percent for schools with high concentrations of Southeast Asians and high dropout rates for Filipinos (46 percent) and Samoans (60 percent) in 1992. The median family income in 1990 for all Asian Americans was $41,241 but only $14,327 for Hmongs, $18,126 for Cambodians, and $23,101 for Laotians.

The NELS data are subject to relatively high standard errors because of the small sample sizes for these groups (for example, the total number of Asian Americans was 961, with only 70 Japanese and 97 South Asians in the sample) and clustering can be expected to increase the size of the standard errors further. (For example, many of the Japanese students may attend just a small number of the sampled schools.) Thus, the data are illuminating, but should not be considered definitive estimates. The groups of native-born and foreign-born Asian Americans were roughly equal in size, so the sample size is less of an issue for that portion of the analysis (though clustering remains an issue).

[2] Southeast Asians include Vietnamese, Laotian, Cambodian/Kampuchean, and Thai. South Asians include Asian Indian, Pakistani, Bangladeshi, and Sri Lankan.

[3] The Second Follow-Up Survey of the 1988 National Education Longitudinal Study of 1988 (NELS:88) was conducted in 1992 by the National Opinion Research Center (NORC) at the University of Chicago for the National Center for Education Statistics, U.S. Department of Education.

designed to determine the achievement levels of precollege students in a number of areas, including mathematics and science and to measure changes in achievement over time. Both mathematics and science assessments are administered periodically to students in the 4th, 8th, and 12th grades. National results are reported by NAEP for each grade level and within various subgroups (for example, males and females, racial/ethnic groups).

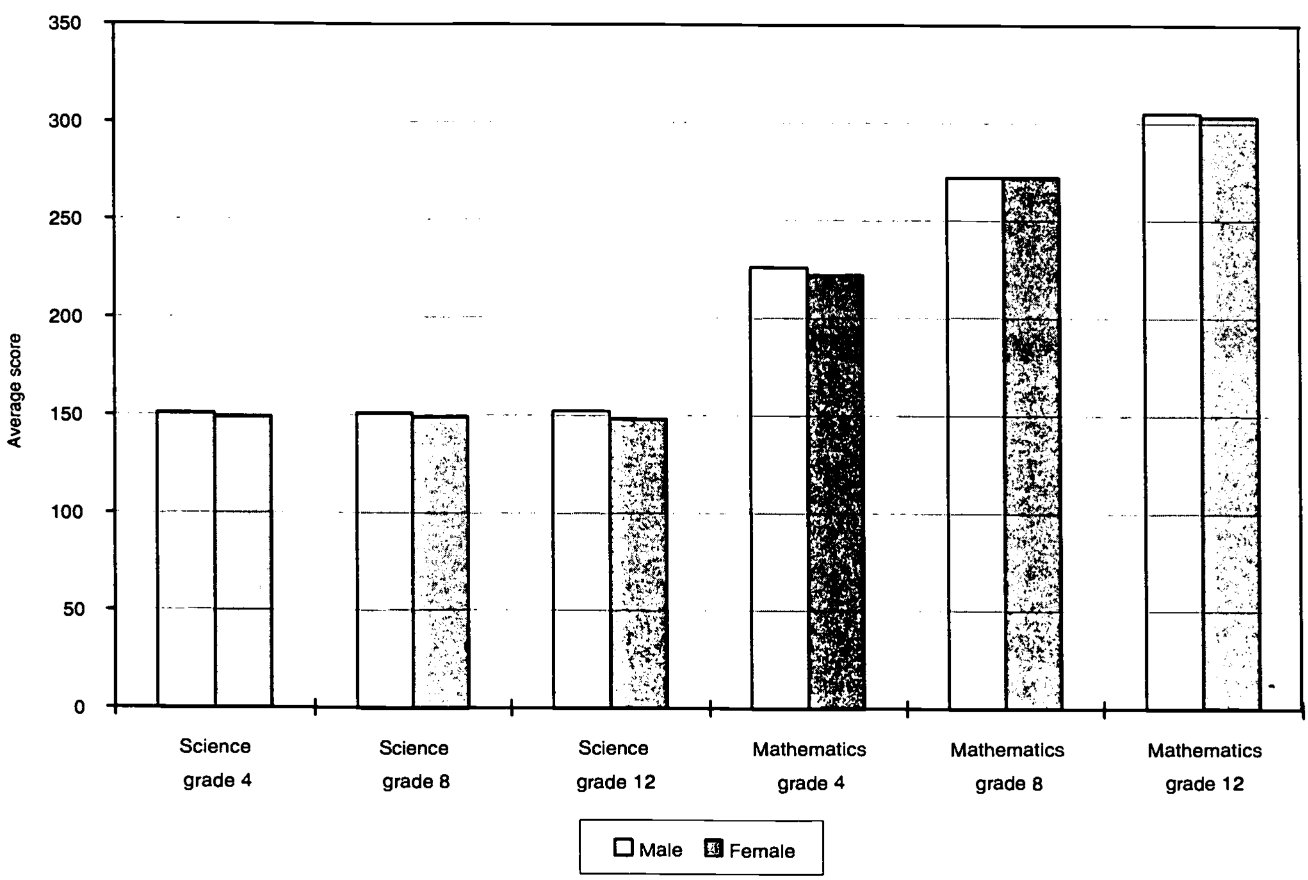
Mathematics

The 1996 NAEP mathematics assessment measured mathematics performance in five content areas: number sense, properties, and operations; measurement; geometry and spatial sense; data analysis, statistics, and probability; and algebra and functions as well as mathematical abilities (conceptual understanding, procedural knowledge, and problem solving) and mathematical power (reasoning, connections, and communication). Achievement was measured on a scale ranging from 0 to 500.

Results of the 1996 mathematics assessment showed that the gender gap in mathematics achievement is narrowing. (See appendix table 2-6.) Previous NAEP mathematics assessments showed that males scored higher than females in grade 12, but in 1996, average mathematics scores for males and females in 8th and 12th grade were not significantly different. (See figure 2-3.) In 4th grade, the average mathematics assessment score for males (226) was higher than that for females (222). (See appendix table 2-7.) Although the difference is small, it is statistically significant.

Differences remain, however, in the percentages performing at the *proficient* and *advanced* levels of

Figure 2-3.
Average NAEP mathematics and sciences scores at grades 4, 8, and 12, by sex: 1996

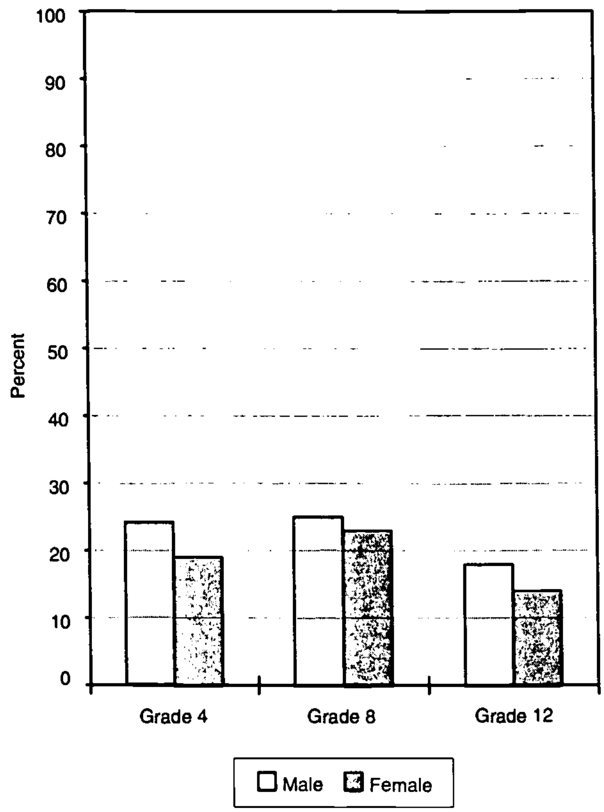


NOTE: Science scale scores, which range from 0 to 300, were developed independently for each grade assessed. Mathematics scale scores ranged from 0 to 500 across all three grades.

See appendix table 2-6.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Figure 2-4.
Percentage of students scoring at or above proficient level on NAEP mathematics assessment in grades 4, 8, and 12, by sex: 1996



See appendix table 2-8.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

NAEP Achievement Levels

Basic level—denotes partial mastery of the knowledge and skills that are fundamental for proficient work at a given grade.

Proficient level—represents solid academic performance. Students reaching this level demonstrate competency with a range of challenging subject matter.

Advanced level—signifies superior performance at a given grade.

These performance levels are cumulative—students performing at the advanced or proficient levels also perform at the immediately preceding levels.

achievement. NAEP developed three achievement levels—basic, proficient, and advanced—to measure level of knowledge and skills. (See sidebar, this page.) Among 8th graders, the differences in the percentages of male and female students at each achievement level were not statistically significant. (See appendix table 2-8.) Among 4th and 12th grade students, however, higher percentages of males than females scored at the *advanced* level and at or above the *proficient* level. (See figure 2-4.)

Science

The 1996 NAEP science assessment measured achievement on knowledge of facts, concepts, and analytical reasoning skills; abilities to explain, integrate, apply, reason about, plan, design, evaluate, and communicate scientific information: and abilities to use materials to make observations, perform investigations, evaluate experimental results, and apply problem-solving skills. Science achievement was measured on a scale ranging from 0 to 300.

Among 12th graders, female students scored lower than male students on the 1996 science assessment. (See figure 2-3.) Although the average science scores (152 for males and 148 for females) did not differ greatly, the difference is statistically significant. The differences in males' and females' science scores at grades 4 and 8 are not statistically significant.

The International Gender Gap in Mathematics and Science Achievement

The United States is one of many nations worldwide in which the gender gap in mathematics and science achievement has virtually disappeared (Peak, 1997). No statistically significant difference was found between the mathematics scores of 8th grade boys and girls in 33 nations, including the United States, that participated in the Third International Mathematics and Science Study (TIMSS).[4] Further, no statistically significant difference was found between the science scores of 8th grade boys and girls in 11 nations, including the United States, that participated in TIMSS. The 11 nations with no statistically significant gender differences in 8th grade mathematics and science scores were Australia, Columbia, Cyprus, Flemish Belgium, Ireland, Romania, the Russian Federation, Singapore, South Africa, and the United States.

[4] TIMSS was a study of science and mathematics knowledge in 41 nations during the 1995 school year.

Gender Differences in Attitudes Toward Science and Mathematics

Attitudes toward science and mathematics both reflect and reinforce achievement in these subjects. Those who do well tend to like science and mathematics, and those who like these subjects tend to have higher levels of achievement in them. It is not that surprising then that females' and males' attitudes toward science and mathematics are similar given that their achievement levels are becoming more similar. Results from the 1995 TIMSS study show that for the most part, female and male students in 4th grade and in 8th grade were similar in their attitudes toward science and mathematics.

Among 4th graders in the United States and in many countries, little difference was found in males' and females' self-perceptions of doing well in mathematics (Mullis et al., 1997). Among 8th graders, females and males were about equally likely to like mathematics (Beaton et al., 1996b). In several countries, however, (Austria, France, Germany, Hong Kong, Japan, Norway, and Switzerland) males were more likely to like mathematics than were females. In Ireland, a greater percentage of females than males liked mathematics.

Similarly, among 4th and 8th graders, males and females in most countries that participated in the study (including the United States) did not differ significantly in self-perceptions of doing well in science or in liking science. In Austria, Japan, and Korea, however, a greater percentage of male than female 4th graders liked science, and in Iceland and Ireland a greater percentage of females than males liked science (Martin et al., 1997). Some differences were apparent by subject area, however. Eighth grade males and females differed little in liking of biological science or earth science, but male students in most countries were more likely to like physical science than were females (Beaton et al., 1996a).

Minorities

Mathematics Course Taking

Although substantial differences in course taking by racial/ethnic groups remain, the percentages of black, Hispanic, and American Indian students taking many basic and advanced mathematics courses have doubled between 1982 and 1994. For example, in 1982, 22 percent of black high school graduates had taken algebra II. By 1994, 44 percent had taken this course. (See figure 2-5.) Similarly, 29 percent of black high school graduates in 1982 had taken geometry, 6 percent had taken trigonometry, and 1 percent had taken calculus. By 1992, these percentages had increased to 58 percent, 14 percent, and 4 percent, respectively. (See appendix table 2-9.)

Despite the gains, racial/ethnic groups differ greatly in mathematics course taking. Black and Hispanic high school graduates in 1994 were more likely than white and Asian students to have taken remedial mathematics courses: 31 percent of black, 24 percent of Hispanic, and 35 percent of American Indian high school graduates, compared with about 15 percent of whites and Asians had taken remedial mathematics in high school. Black and Hispanic high school graduates in 1994 were less likely than white and Asian students to have taken advanced mathematics courses. Although more than 60 percent of both white and Asian students had taken algebra II, 44 percent of blacks, 51 percent of Hispanics, and 39 percent of American Indians had taken this course. Asians were the most likely of any racial/ethnic group to have taken advanced mathematics courses. Almost one-third of Asians had taken precalculus and 23 percent had taken calculus. By contrast, 18 percent of white, 10 percent of black, 14 percent of Hispanic, and 9 percent of American Indians had taken precalculus and less than 10 percent of any of these groups had taken calculus. (See appendix table 2-9.)

Science Course Taking

As is the case with mathematics course taking, blacks, Hispanics, and American Indians are taking more science classes than they took in the past. The percentage of blacks and Hispanics taking chemistry and physics doubled between 1982 and 1994. In 1982, 22 percent of black, 16 percent of Hispanic, and 26 percent of American Indian high school graduates had taken chemistry. By 1994, this had increased to 44 percent, 46 percent, and 41 percent respectively. In 1982, approximately 7 percent each of blacks, Hispanics, and American Indians had taken physics; by 1994, 15 percent of blacks, 16 percent of Hispanics, and 10 percent of American Indians had taken physics. (See appendix table 2-9.)

Despite these gains, the percentage of black. Hispanic, and American Indian students taking chemistry and physics is below the percentage of white and Asian students taking these courses. Fifty-eight percent of white and 69 percent of Asian high school graduates

in 1992 had taken chemistry, and 26 percent of white and 42 percent of Asian students had taken physics.

Mathematics and Science Achievement

Mathematics

Average mathematics scores have increased for all racial/ethnic groups since 1990, but differences between the scores of white students and black and Hispanic students have not significantly narrowed. For example, among 12th graders in 1990, the average difference between white students' mathematics scores and those of black students was 33 points. In 1996, it was 31 points. (See appendix table 2-7.) The average difference between 12th grade white students' mathematics scores and those of Hispanic students was 25 points in 1990; in 1996, it was 24 points. Differences are as great among 4th graders. In 1996, the average gap in mathematics scores between white and black 4th graders was 32 points, and the average gap between white and Hispanic 4th graders was 26 points.

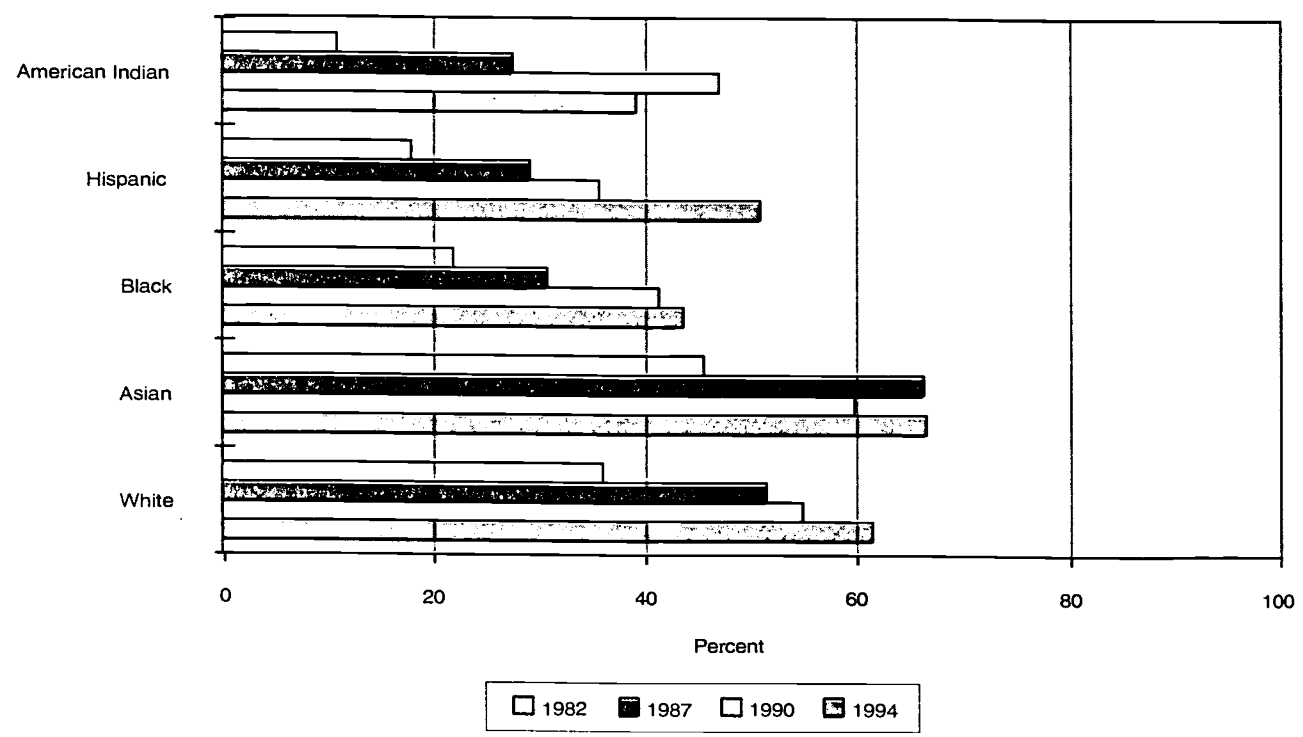
Differences by race/ethnicity also existed in the percentages performing at *proficient* levels in mathematics. Among 4th, 8th, and 12th grade students, more than 20 percent of white students and less than 10 percent of black, Hispanic, and American Indian students scored at or above the *proficient* level. (See appendix table 2-8.) Half, or more than half, of black and Hispanic students at all three grade levels scored below the *basic* proficiency level in mathematics compared with about one-fourth of white students. (See figure 2-6.)

Science

As with mathematics scores, differences in science scores persist across racial/ethnic groups. Scores for white, Asian, and American Indian students are substantially higher than those for black and Hispanic students in grades 4, 8, and 12.[5] (See figure 2-7.) Among 12th graders in 1996, average science scores were 159 for whites, 149 for Asians, 145 for American Indians, 130 for Hispanics, and 124 for blacks.

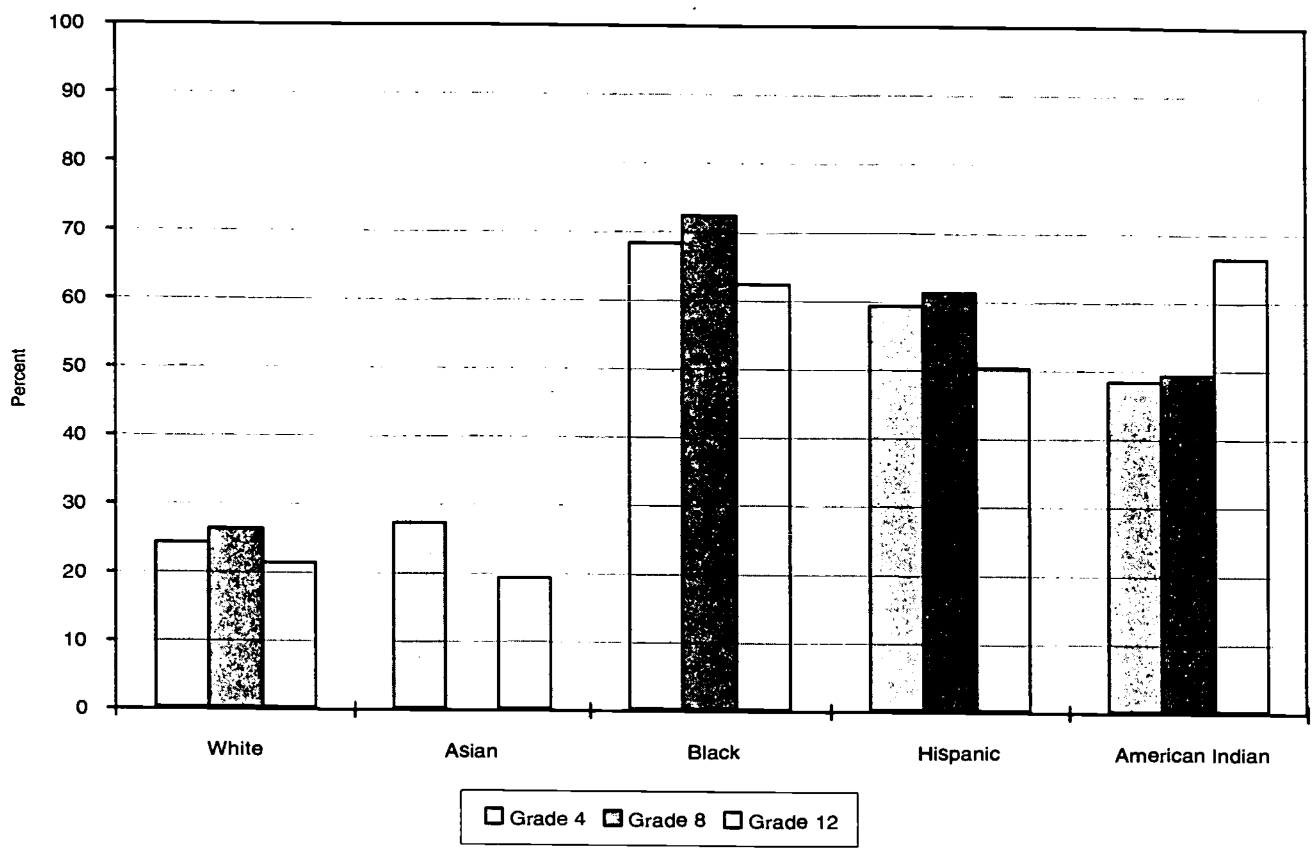
[5] An accurate determination of the standard error associated with the average scale score for 12th grade American Indian students was not possible; therefore differences between this group and other groups at grade 12 should be interpreted with caution.

Figure 2-5.
Percentage of high school graduates taking algebra II in high school, by race/ethnicity: 1982, 1987, 1990, and 1994



See appendix table 2-9.

Figure 2-6.
Percentage of students in grades 4, 8, and 12 scoring below the basic proficiency level in mathematics, by race/ethnicity: 1996



NOTE: Results for 8th grade Asian students not available.

See appendix table 2-8.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Students With Disabilities

Variations in Estimates of the Number of Students With Disabilities

Determining the number of students with disabilities is challenging given variations in age ranges of the population, in definitions, in data collection procedures, and in the individual reporting the disability (for example, student, parent, teacher, school official) (Rossi, Herting, and Wolman, 1997). For differences in prevalence and classification from various sources, see text table 2-1.

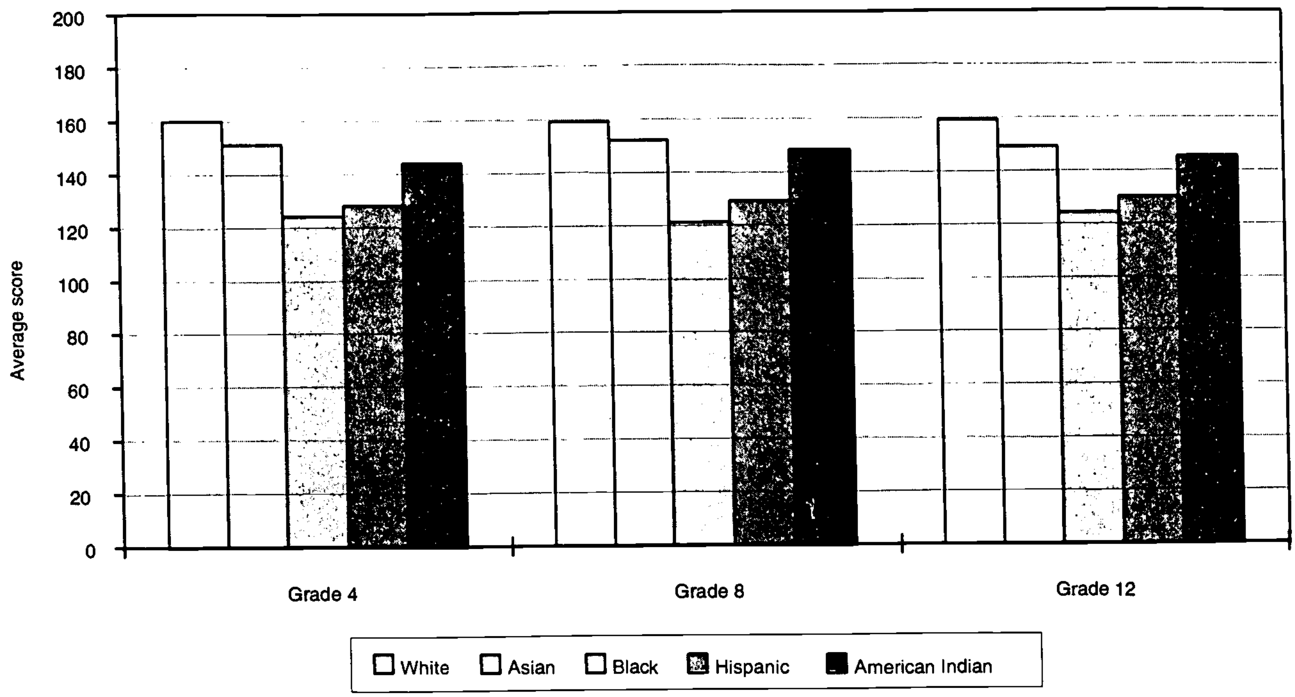
According to the Department of Education's Office of Special Education and Rehabilitative Services, the percentage of children enrolled in school and between the ages of 6 and 17 who were served in Federally supported special education programs was 10 percent in 1994–1995.[6 7 8] Eight percent of all children ages 6 through 21 were served in these programs. Fifty-one percent of the children age 6 through 21 with disabilities had specific learning disabilities, and another 21 percent had speech or language impairments. (See appendix table-2-10.) About 12 percent were mentally retarded, 9 percent had a serious emotional disturbance, 2 percent had "other" health impairments, and 1 percent each had

6 It should be noted that not all children with impairments require special education.

7 The data collected by the Office of Special Education and Rehabilitative Services are the only data collected specifically to provide counts of students eligible to receive services.

8 The Individuals with Disabilities Education Act (IDEA), Part B, requires that "all children and youth with disabilities have access to a free appropriate public education that is determined on an individual basis and designed to meet their unique needs" (Barbett and Korb, 1997).

Figure 2-7.
Average NAEP science scores at grades 4, 8, and 12, by race/ethnicity: 1996



NOTE: Science scale scores, which range from 0 to 300, were developed independently for each grade assessed.

See appendix table 2-6.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

mobility or hearing impairments. Visual impairments, autism, deaf-blindness, and traumatic brain injury each accounted for less than 1 percent of the students with disabilities.

Students participating in Federal programs for children with disabilities have been increasing both in number and as a fraction of total public school enrollment. Between 1977 and 1995, the number of students who participated in Federal programs for children with disabilities increased 47 percent, from 3.7 million to 5.4 million students. Part of this growth is due to an increase in the number of students identified with specific learning disabilities. Students with specific learning disabilities increased from approximately 800,000 students or 2 percent of total public K–12 enrollment in 1977 to 2.5 million students or 6 percent of total public K–12 enrollment in 1995. The number of students with other types of disabilities (with the exception of students with serious emotional disturbance) went down during that time period (U.S. Department of Education, 1997).

Students with disabilities made up 11 percent of students in grade 4, 9 percent of students in grade 8, and 5 percent of students in grade 12 in 1996 (Reese et al., 1997). These students take fewer science and mathematics courses, have lower grades, and have lower achievement scores than students without disabilities.

Mathematics and Science Course Taking

Twelfth-grade students with disabilities[9] earned fewer credits in mathematics in 1992 than did those without disabilities. (See appendix table 2-11.) Differences are not great by type of disability. Students with disabilities also earned fewer science credits than those without disabilities. (See appendix table 2-11.)

Mathematics and Science Achievement

Students with disabilities have lower average high school grades in mathematics and in science than those without disabilities. (See appendix table 2-11.)

[9] Students were identified by their parents as being disabled. The source of these data is the National Center for Education Statistics, National Education Longitudinal Study, 1988.

Text table 2-1.
Data sets on disability prevalence among children in the United States[1]

	1988 NELS (8th grade)[2]		HS & B (10th grade)[3]			1988 NAEP (age 13)[4]		1992 CPS (age 5–17)		1988 NHIS/CH Under age 18)[5]		1994 OSEP (age 6–21)[6]	
Classification (Parent report)	% with condition	% received services	Classification (student report)	% 1980	% 1982	Classification	%	Classification	%	Classification	%	Classification	%
Mental retardation	0.1 [3.1][7]	0.0				Mentally retarded	1.0 [20.4]	Mental retardation	0.7	Delay in growth or development	4.0	Mental retardation	0.9
Specific learning problem	6.1	7.6	Specific learning disability	2.6	1.7	Learning disabled	2.1 [43.5]	Learning disability	4.3	Learning disability	6.5	Specific learning disability	4.1
Emotional problem	2.8	2.6				Emotionally disturbed	0.3 [6.1]	Serious emotional disturbance	0.9	Emotional or behavioral problem (age 3-17)	6.1	Serious emotional disturbance	0.7
Speech problem	1.6	6.9	Speech disability	1.6	1.1	Speech impaired	0.1 [1.3]	Speech impairment	2.5	Speech impairment	2.6	Speech or language impairment	1.7
Hearing problem	2.2	1.9	Hard of hearing	2.2	1.8	Hard of hearing	0.0 [0.5]	Other hearing impairment	1.2	Deafness and hearing loss	1.5	Hearing impairment	0.1
Deafness	0.4	0.3	Deafness	0.4	0.5	Deaf	0.0 [0.2]	Deafness	0.4				
Visual handicap (not correctable with glasses)	1.6	1.1	Visual handicap[8]	1.6	1.5	Visual handicap/ blind	0.0 [0.2]	Other visual impairment	1.8	Blindness and vision impairment	1.3	Visual impairment	<0.1
						Deaf/blind	0.0 [0.1]	Blindness	0.3			Deaf-blindness	0.0
Orthopedic problem	0.9	1.1	Orthopedic problem	1.3	0.9	Orthopedically impaired	0.0 [0.7]	Orthopedic impairment	1.0	Musculoskeletal impairments	1.5	Orthopedic impairment	0.1
Other physical disability	1.1 [0.4][7]	0.8	Other health impairment	2.0	2.6	Multidisabled	0.2 [3.2]	Other health impairment	1.9			Multiple impairment	0.2
Any other health problem	3.7	2.3				Other	0.3 [5.5]					Other health impaired[9]	0.1
Total	15.9[10]	19.5[10]		11.7	10.1		4.0		15.0		23.5		8.0

BEST COPY AVAILABLE

NOTES:

1 Data sets include National Educational Longitudinal Study (NELS), 1988; High School and Beyond (HS&B), 1980 and 1982 sophomore cohort; National Assessment of Educational Progress (NAEP), 1988, 13-year-olds; Current Population Survey (CPS), 1992 October Supplement on School Enrollment; National Health Interview Survey on Child Health (NHIS/CH), 1988; Office of Special Education Programs (OSEP) State-reported data. Data and notes for NAEP, CPS, and NHIS/CH were abstracted from Westat, Inc. (1994).

2 NELS:88 data are derived from the base-year parent survey as follows: Weighted percentages in first column (% with condition) are derived from variable BYP47; weighted percentages in the second column (% received services) are derived from variable BYP48. The unbracketed percentages in these columns include only those students who were included in the 1988 base-year parent survey. They do not include students who were judged ineligible to participate in the base-year survey (i.e., the base-year ineligible, or BYI, students described in the last section of this appendix). These students are shown in the bracketed percentages, as explained in note 7 below.

3 HS & B data abstracted from Owings, J. and Stocking, C. (1985).

4 Bracketed figure is the disability prevalence among the approximately 5 percent of students excluded from NAEP because of physical disability, mental disability, or language problem. Approximately 79 percent of excluded 13-year-olds had a disability; the remainder had only a language problem. The first, unbracketed, percentage figure is the number of excluded students with a disability as a percent of total students. (In 1988, NAEP collected no data on the specific disability categories of included students.)

5 The first three items: Delay in growth or development, Learning disability, and Emotional or behavioral problem (age 3–17) include children who have ever had the condition (lifetime prevalence). Concerning the third, when two additional questions are included: Has the child ever been treated for any emotional, mental, or behavioral problem or ever had anyone suggest that the child needed such treatment, the rate increases to 13.4 percent. The remaining items come from the Child Health questionnaire for chronic conditions, and the rates are conditions per 100 persons rather than percent of persons. A person may have more than one condition per category, especially Musculoskeletal impairments, which consists of many subgroups; so the condition rate may exceed the number of separate individuals involved.

6 Data from table AA25 in the Sixteenth Annual Report to Congress on the Implementation of the Individuals with Disabilities Education Act (OSEP 1994). Data are based on counts of students, ages 6–21, served in special education programs under IDEA, Part B, and chapter 2 of ESEA (SOP/State Operated Programs), as a percentage of U.S. Census Bureau estimates of resident populations, by state, for July 1992. This excludes children and disabilities unrelated to special education needs as defined by the federal disability categories.

7 The bracketed percentages for the categories Mental retardation and Other physical disability reflect the percent of students, in terms of the total population, who were judged to be ineligible to participate in the base-year NELS: 88 survey on the basis of mental or physical disability (i.e., BYI sample).

8 In the 1982 survey, "not correctable with glasses" was added to the definition.

9 Other health impairments include Autism and Traumatic brain injury (categories added under IDEA in 1990).

10 Each NELS:88 "total" is the total weighted percentage of students whose parents indicated they have one or more disability-related problems (first column) or have ever received services for one or more disability-related problems (second column). These percentages are smaller than the sums of the individual column percentages because parents attributed more than one disability-related problem to some students (i.e., adding the column percentages would have produced duplicated counts).

SOURCE: Rossi, Herting, and Wolman (1997, table A.3).

Federal Definitions of Special Education Disability Categories

Specific learning disability. A disorder in one or more of the basic psychological processes involved in understanding or using language, spoken or written, which may manifest itself in an imperfect ability to listen, think, speak, write, spell, or do mathematical calculations; this includes perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia, but does not include learning problems resulting from visual, hearing, or motor handicaps, or from mental retardation.

Seriously emotionally disturbed. Exhibition of behavior disorders over a long period of time that adversely affect educational performance; this includes an inability to learn that cannot be explained by intellectual, sensory, or health factors; an inability to build or maintain satisfactory interpersonal relationships with peers and teachers; inappropriate types of behaviors or feelings under normal circumstances; a general pervasive mood of unhappiness or depression; or a tendency to develop physical symptoms or fears associated with personal or school problems.

Speech impaired. Communication disorders, such as stuttering, impaired articulation, and language or voice impairments, that adversely affect educational performance.

Mentally retarded. Significantly subaverage general intellectual functioning with concurrent deficits in adaptive behavior that were manifested in the development period and that adversely affect educational performance.

Visually impaired. A visual impairment that, even with correction, adversely affects educational performance, including students who are partially sighted or completely blinded.

Hard of hearing. A hearing impairment, permanent or fluctuating, that adversely affects educational performance but that is not included in the deaf category.

Deaf. A hearing impairment that is so severe that the child is impaired in processing linguistic information through hearing, with or without amplification, which adversely affects educational performance.

Orthopedically impaired. A severe orthopedic impairment that adversely affects educational performance, including those caused by congenital anomaly, disease, or other causes.

Other health impaired. Limited strength, vitality, or alertness due to chronic or acute health problems that adversely affect educational performance (includes autistic students).

Multiply handicapped. Concomitant impairments, the combination of which causes such severe educational problems that they cannot be accommodated in special education programs solely for one of the impairments (does not include deaf/blind).

Deaf/blind. Concomitant hearing and visual impairments, the combination of which causes such severe communication and other developmental and educational problems that they cannot be accommodated in special education programs solely for deaf or blind students.

SOURCE: U.S. Department of Education, Office of Special Education Programs. 1991. *Youth With Disabilities: How Are They Doing? The First Comprehensive Report from the National Longitudinal Transition Study of Special Educational Students.* Menlo Park, CA: SRI International, pp. 2–3.

Twelfth grade students with disabilities scored lower than those without disabilities on standardized cognitive tests of mathematics proficiency[10] and had less gain in scores from 1988 to 1992 than students without disabilities. Students with disabilities were more likely than those without disabilities to score in the lowest proficiency levels on these tests. (See appendix table 2-12.) Students with multiple disabilities and students with learning disabilities scored at the lowest performance levels. Students identified as having health problems had 1992 proficiency scores similar to students without disabilities and had gains in proficiency from 1988 to 1992 similar to those without disabilities.

High School Completion

Racial/ethnic and disability status differences in high school completion rates contribute to differences in college enrollment. (Women are as likely to graduate from high school as men—among people age 25 or older, 82 percent of both men and women graduated from high school.) Among all people age 25 or

[10] These tests were administered to all NELS:88 student participants in 1992. The most severely disabled students were excluded from this survey.

Increasing the Inclusion of Students With Disabilities in Science and Mathematics Assessments

Students with disabilities were often excluded from the National Assessment of Educational Progress (NAEP) in the past because State and local policies often excluded them from testing, school staff may have believed they were unable to participate fully, and no accommodations were available that met the needs of their legally required Individualized Education Plans. Half or more than half of students with disabilities were excluded from NAEP assessments before 1995.

The 1996 NAEP science and mathematics assessment explored the effects of various mechanisms to increase the participation of students with disabilities in the national assessments. Exclusion or inclusion rules were changed to be clearer, rules were more inclusive and more likely to be applied consistently, and accommodations were provided, including "provision of large-print booklets and large-face calculators, provision of Braille booklets and talking calculators, and accommodations in administration procedures (e.g., unlimited testing time, individual or small-group administrations, allowing a facilitator to read directions, allowing students to give answers orally, allowing students to give answers using a special mechanical apparatus)" (Olson and Goldstein, 1996, p. 5).

Before these modifications can be implemented as official policy, several statistical and measurement issues need to be addressed. One of the issues to be addressed is the effect of accommodations or adaptations on measurement of trends in achievement. Inclusion of additional students and improved testing of students with disabilities who have in the past been assessed under standard conditions complicates the interpretation of trend results. Another issue is the comparability of results of students included and assessed with accommodations to those from other students. The special sample design developed for the 1996 NAEP assessment will allow these issues to be examined.

older in 1995, 86 percent of non-Hispanic whites, 74 percent of non-Hispanic blacks, and 53 percent of Hispanics were high school graduates. (See appendix table 2-13.)

Gains in high school completion by blacks in recent years have narrowed the educational gap. In 1975, 87 percent of whites and 71 percent of blacks in the 25 to 29 age group had completed high school. By 1995, 92 percent of whites and 87 percent of blacks in that age range had completed high school.

Hispanics (of any race) have the lowest high school completion rates and have experienced the least gains over time. In 1995, 57 percent of those in the 25 to 29 age group were high school graduates, a modest increase from 53 percent in 1975. The low high school completion rates are partly explained by the large number of foreign-born Hispanics who entered the United States without a high school education. The lower high school completion rates for blacks and Hispanics may also be related to family income. Youths between the ages of 16 and 24 who lived in families with low income levels were eight times more likely to drop out than those from families with higher incomes (McMillan and Kaufman, 1997).

Students with disabilities have an annual dropout rate of 5 percent. Students with disabilities who drop out of school are less likely than those without disabilities to eventually receive high school diplomas or certificates. Drop out and graduation rates vary by type of disability, with those with visual and hearing impairments most likely to have graduated with a diploma. Those with serious emotional disturbances are most likely to have dropped out. (See appendix table 2-14.)

Transition to Higher Education

The United States has one of the highest rates in the world of secondary students who go into higher education and earn college degrees (National Science Board, 1998). The transition from secondary school to college is an important step, not only to the person making it, but also to a nation committed to the education of its citizens in a technological world. This section analyzes data primarily on high school seniors who graduated in 1996, many of whom will earn a college degree in the year 2000.

Usually, many people are involved in the student's decision to attend a college—students and their parents, along with guidance counselors and teachers. For students from low-income families, however, guidance counselors, teachers, friends, and youth leaders are almost as important as parents in helping to make decisions about post-high-school plans (Gallup International Institute, 1996.) These individuals help students to assess their strengths and weaknesses and to clarify their goals; the earlier in high school they are discussed, the more successful students are in attaining their goals

(Rodriguez, 1993). Taking assessment tests during high school also helps students ascertain their strengths and weaknesses and choose suitable colleges.

Several organizations are also involved in assessing student aptitude or achievement. In 1900, the College Board was founded as a national membership association of schools and colleges. The College Board currently administers the Advanced Placement, the Preliminary SAT (PSAT), and the SAT tests through the Educational Testing Service. In 1961, American College Testing (ACT) was founded to measure students' educational development through the ACT Assessment. None of these tests individually provides data that can be considered nationally representative of all college bound seniors, because students in different states tend to take either the SAT or the ACT (see sidebar on State-by-State breakout of SAT or ACT on page 29), but they do provide information on the transition from high school to college.

Almost three-fourths of high school seniors take either the SAT or the ACT in preparation for applying to college.[11] Results of these exams are important to students for planning purposes and to colleges for admissions purposes. It is important to note, however, that many students who go to 2-year colleges do not take either test, and that approximately 10 percent of 4-year colleges indicate that SAT and ACT scores are optional for admission (calculation by NSF/SRS based on data from National Center for Fair & Open Testing 1997 and from National Center for Education Statistics 1997 IPEDS surveys, unpublished tabulations).

It is important to note that although test scores can help evaluate a student's academic preparedness in terms of strengths and weaknesses, "directors of admission say that high school grades are still the most important factor in the selection of a freshman class" (College Board, 1997b, p. 4). The percentage of college admissions directors who indicated that school achievement was very important was 87 percent, compared with 46 percent who indicated that test scores were very important; however, highly selective colleges may base admissions on formulas in which standardized test scores account for as much as two-thirds of the calculation (Hernandez, 1997). Although they do not measure many characteristics necessary for success in college, such as motivation, creativity, and persistence, admissions tests are designed to provide a consistent measure across the variety of curricula and opportunities offered in U.S. high schools.

Women

Women accounted for the majority of test-takers of the Advanced Placement (see page 28) tests (55 percent), the SAT (53 percent), and the ACT (55 percent) in 1996. The number of women taking these tests has increased considerably in the 1990s, and women are also increasing their performance on the tests. In fact, they provide most of the increases seen in total test scores for the ACT and over half in the SAT since 1991,

[11] National Center for Education Statistics, NELS:88, Data Analysis System, unpublished tabulation.

The ACT

The ACT Assessment Test is a 2-hour 40-minute, multiple-choice examination administered five times a year by the American College Testing Program in Iowa. According to ACT, the test is designed to measure critical reasoning and higher order thinking skills in four curriculum areas—English, mathematics, reading, and science. The composite score is an average of the scores on each of the components on a scale from 1 to 36, with a mean of 18 for the sample of students who take the test nationally. Scores must be different by more than 0.2 points to be significant at the 95 percent level of confidence.

ACT states that these tests reflect students' skills and achievement levels as products of their high school experience and serve as measures of preparation for academic work in college. ACT results are used by postsecondary institutions for admissions, academic advising, course placement, and scholarships. A Federal court has faulted colleges in Mississippi, however, for basing student aid awards on cut-off scores from the ACT because it restricts black students' access to predominantly white colleges (Healy, 1997).

Most students take the test in their junior year of high school. (There is a P-ACT+ test offered that helps students to become familiar with the test format before taking the ACT.) The students who take the ACT are self-selected and do not represent the entire population of college-bound students. Further, the percentage of students who take the ACT, as opposed to the SAT, varies considerably by State. (See sidebar on page 29.) Many factors—such as motivation to learn, parental support, the quality of teaching, socioeconomic status—contribute to individual and group achievement scores (American College Testing, 1996).

The SAT

The SAT is a 3-hour, primarily multiple-choice test that measures verbal and mathematical reasoning abilities. According to the SAT Program, it is related to successful freshman performance in college and is intended to supplement the high school record and other information about the student in assessing readiness for college-level work. Over the years, the average SAT scores have drifted downward from 500 on both sections to 424 on the verbal and 478 on the mathematics sections. The main reason average SAT scores have drifted is the dramatic expansion in the number of test takers from 10,000 in its beginning to over 1 million now. Beginning in April 1995, the SAT scores were "recentered" to 500 as the midpoint of the 200–800 scale for both the verbal and mathematics portions. All tables in this report use the recentered scores that have been calculated by the College Board for earlier years. The College Board has studied the complex area of how well the SAT predicts freshman grades. (College Board, 1996d).

Text table 2-2.
Average test scores for college-bound seniors, by sex: 1991 and 1996

Sex	SAT				ACT	
	Verbal		Mathematics		Composite	
	1991	1996	1991	1996	1991	1996
Women........	495	503	482	492	20.4	20.8
Men............	503	507	520	527	20.9	21.0

NOTE: Scores for the 1991 SAT have been converted to the recentered scale.

SOURCES: College Board and American College Testing tabulations, 1996.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

although men have increased their scores also. (See text table 2-2.)

The ACT score changes show greater progress for women, as the overall gap in composite scores between men and women narrowed from 0.5 points in 1991 to 0.2 points in 1996, not a significant difference. The SAT scores indicate that women have made greater progress than men from 1991 to 1996 in both verbal and mathematics mean scores. In this period, the mean scores changed in the following ways:

- verbal increased 8 points for women and 4 points for men;
- mathematics increased 10 points for women and 7 points for men.

Even with this progress for women, women's scores on average are lower than men's in 1996 on the SAT. Two ways in which men and women taking the college placement tests differ are in their socioeconomic characteristics and type of coursework taken in high school.

Socioeconomic Differences

From the SAT and ACT student data, it is clear that a larger number of women than men from lower income families choose to take college entrance tests. Although the proportions of test takers from the higher family income groups were about evenly split between males and females, among the lowest income groups, women accounted for over 60 percent of the test takers. (See appendix table 2-15.) Given that parental income is related to average scores (College Board, unpublished tabulations), then this fact would mean that the higher proportion of women test takers who are from low-income families would likely reduce the overall averages for women test takers.

Course-Taking Differences

Do course-taking differences account for test score differences among groups? This was believed earlier, as a 1987 National Academy of Sciences report stated that "The general consensus is that these gender differences in college admission mathematics test scores can be largely accounted for by differences in the amount of mathematics, physical science, and computer programming courses that high school and college-bound women take compared to their male peers" (LeBold, 1987, p. 67). More recent studies have shown that although this is a small part of the explanation, there is "the need for more comprehensive research on gender, race, and SES [socio-economic status] differences in science achievement growth" (Madigan, 1997, p. 12).

Differences between quantitative course taking by female and male high school students have lessened in the 1990s, as shown in earlier sections of this report. Similar proportions of women and men took honors mathematics and science classes (29 percent) according to SAT data for 1996 college bound seniors. (See appendix table 2-16.) In terms of level of classes taken, the percentages of women and men taking

higher level mathematics were nearly the same. Only small gaps remained between the percentages of men and women who had taken trigonometry (2 percent), precalculus (3 percent), and calculus (4 percent). In science classes, similar percentages of both men and women had taken biology and chemistry; however, a larger gap existed in the percentage who had taken physics (9 percentage points higher among men than women) (College Board. 1996, SAT unpublished tabulations).

The reduction in differences in mathematics course taking leads to the question, Are the average mathematics scores of men and women who took the same level mathematics class more similar? At the lower mathematics level classes (geometry and trigonometry), differences in the mean SAT scores of men and women persist but are smaller than differences at the higher level classes, such as calculus, according to both SAT and ACT data.

An examination of SAT mathematics test scores for only the students who reported taking the highest level of mathematics (calculus) and science (physics) showed that women scored lower on average than men. Among those who took calculus, women averaged 594 and men 631 on the SAT mathematics test; this difference—37 points—is similar to that for men and women test takers in general (35 points difference). Among those who took physics, women averaged 542 and men 577—a 35-point gap (College Board, 1996, SAT unpublished tabulations).

ACT data also show that women who took calculus and physics reported higher grade point averages than men in their high school mathematics and science classes. In the ACT mathematics and science test sections, however, the average scores of women were also lower than those of men. (See text table 2-3.)

Educators and researchers in both the academic community and within the testing organizations have been concerned about the underlying reasons for this disparity. In 1997. ETS released a study (Cole, 1997) that had three interesting results that pertain to this issue.

- In nationally representative samples of 12th graders, "the spread of scores of males tends to be larger than the spread for females. This means that there are more males among the very highest scorers and also more males among the very lowest scorers. Below the 10th percentile and above the 90th percentile, there are about 4 females for every 5 males. We see this low-end result perhaps in the presence of more males in some special education classes.... The high-end result is especially important for self-selected groups, such as those taking high-stakes tests. These groups [students taking the SAT] come from the high end of the distribution and, all other things being equal, we can expect more males than females among such groups and higher average scores for males than for females among such groups" (pp. 16–18).
- Tests measure particular skills on a single day, whereas grades measure a much wider array of skills. "In fact, we view grades as likely measuring a constellation of desirable characteristics that we call 'studenting skills'—skills that are especially valuable in school or in work. These skills may include characteristics such as persistence, follow-through, doing required work, participating, and performing in different contexts.... Years of results in predicting college grades have, for example, shown that grades are most often the single best predictor.... Also, tests have consistently been shown to add to the prediction of college performance beyond that accomplished by grades alone." (See sidebar on SAT, page 25.)

For example, were the SAT used alone, it would slightly underpredict the overall grade-point average of first-year female college students.... One subject, calculus, has yielded larger differences than...most other subjects examined. Earlier results had indicated...underprediction of college calcu-

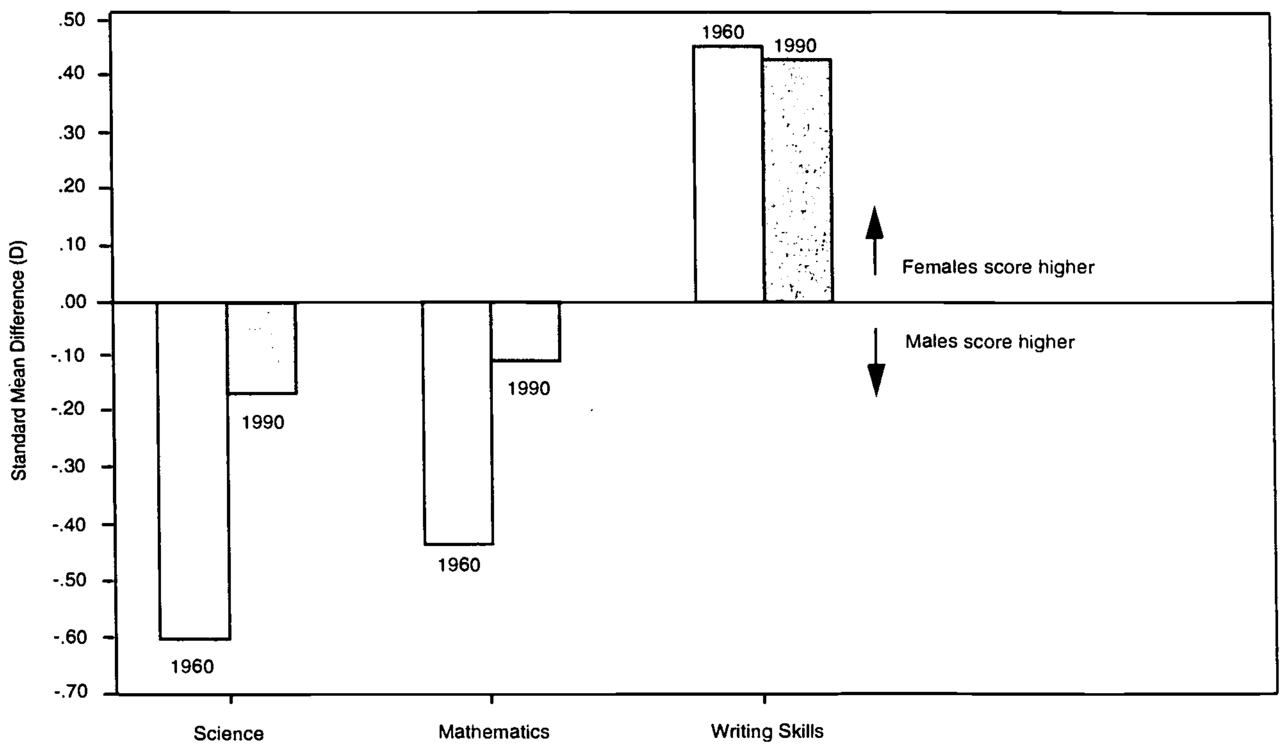
Text table 2-3.
ACT mathematics and science reasoning scores and GPA for women and men who had taken calculus and physics in high school: 1996

High school class	Women	Men
Calculus:		
Mathematics GPA............	3.02	2.94
	30,555	26,922
Mean score....................	24.10	25.40
Physics:[1]		
Science GPA..................	3.15	3.04
	139,084	133,105
Mean score....................	22.00	23.50

[1] Students who had taken general science, biology, chemistry, and physics.

SOURCE: American College Testing, 1996 Profile Report, unpublished tabulations.

Figure 2-8.
Gender difference in three subjects, 1960–1990



SOURCES: Project TALENT and ETS Gender Study
NOTE: Cited in *The ETS Gender Study* by Nancy Cole (May 1997).

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

lus grades when the SAT was used alone[12].... We found that...adding high school grades corrected the underprediction. In fact, using grades alone would have resulted in underprediction of calculus grades for males in those cases" (pp. 19–20). However, both grade point averages and test scores are the key factors in institutional selection, so there may be problems of severe selection bias associated with these findings.

- "We found that the differences cut both ways and that 12th grade girls have substantially closed the familiar mathematics and science gap over the past 30 years, but there continues to be a fairly large gap in writing skills that boys have not closed." (See figure 2-8.)

There is a gap between men and women in writing, but is it relevant for scientists and engineers? As National Education Goals for the year 2000, Goal 3, Objective 2 recommends that "the proportion of college graduates who demonstrate an advanced ability to think critically, communicate effectively, and solve problems will increase substantially" (National Education Goals Panel, 1997). "Good communication skills, both verbal and written, rank high among the top priorities of those in business and industry" (Barabas, 1990). Employers of engineering graduates rated speaking/writing as one of the most important areas of competence, and yet these same areas were identified as the most deficient in these graduates (Kimel and Monsees, 1979).

College Credit From Advanced Placement

Half of the high schools in the United States offer Advanced Placement (AP) college-level classes, and the number of students taking AP tests for college credit is increasing each year, reaching over 500,000 students in 1996. Of these, 200,000 qualified for college credit by earning a certain score on AP exams taken in high school (College Board, 1996c).

[12] Bridgeman, B., and C. Wendler. 1991. Gender differences in predictors of college mathematics performance and in college mathematics course grades. *Journal of Educational Psychology*, 83, 275–284.
Wainer, H., and L.S. Steinberg. 1992. Sex differences in performance on the mathematics section of the Scholastic Aptitude Test: A bidirectional validity study. *Harvard Educational Review*, 62, 323–336.

Of the subjects offered for AP exams, 12 are science or mathematics subjects. Women constituted over half of the test takers in psychology and biology. These subjects were followed by calculus AB[13] (47 percent female) and chemistry (42 percent female). The science subject in which women were least likely to take an AP exam was computer science, where women accounted for only 20 percent of the computer science A and 12 percent of the computer science AB[14] test takers. (See appendix table 2-17.)

Underrepresented Minorities

Introduction

Students who decide to go to college usually take a college admissions test if they are planning to apply to a 4-year college or university, but may not take the test if they are planning only to apply to a 2-year college. Two-year colleges play a somewhat larger role in the higher education of minority students than they do of white students. (See text table 2-4.)

College admission test data for "1996 college bound students," then, may not be representative of all students who went on to college, especially for Hispanic and American Indian students.

For those who decide to take a college admission test, registration includes a student questionnaire. Both the ACT and the SAT student questionnaires ask for race/ethnicity.

[13] The College Board's Advanced Placement Program offers two levels of advanced placement examinations in calculus—calculus AB and calculus BC. Calculus BC covers more advanced topics than calculus AB.

[14] The College Board's Advanced Placement Program offers two levels of advanced placement examinations in computer science—computer science A and computer science AB. Computer science AB covers more advanced topics than computer science A.

Text table 2-4.
Percentage of undergraduates enrolled in 2-year colleges, by race/ethnicity: 1995

Race/ethnicity	Percentage
White	43
Asian/Pacific Islander	46
Black	47
Hispanic	60
American Indian/Alaskan Native	54

SOURCE: Barbett and Korb (1996, p. 15).

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Text table 2-5.
Percentage of college admissions test takers in each racial/ethnic group taking the SAT or ACT: 1996

Racial/ethnic group	Percentage taking SAT	Percentage taking ACT
White	51	49
Asian/Pacific Islander	76	24
Black	55	45
Hispanic[1]	64	36
American Indian/ Alaskan Native	44	56

[1] Does not include students in Puerto Rico.

SOURCE: College Board and American College Testing, unpublished tabulations, 1996.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

- On the form for the SAT, students are asked "How do you describe yourself?" and one of the categories offered is an "other" category. Eleven percent of 1996 SAT test takers chose "other" or did not respond to this question.
- On the form for the ACT, students are asked "Which best describes your racial/ethnic background?" and "other," "multiracial," and "prefer not to respond" categories are offered. Eleven percent of 1996 ACT test takers chose one of these three categories.

Therefore, the data provided on ACT and SAT by race/ethnicity groups cover 89 percent of both ACT and SAT test takers.

There are some differences in the proportions of each racial/ethnic group who take the SAT versus the ACT. (See text table 2-5.) Some of these differences reflect the distinct differences found by State (see sidebar on page 29). For example, American Indian/ Alaskan Natives are much more likely to take the ACT and Asian/Pacific Islanders are much more likely to take the SAT.

Note that the data presented in this section do not include students in Puerto Rico. The ACT is not given in Puerto Rico and although an SAT-equivalent test is given in Puerto Rico, those test scores are not included in the SAT data for Hispanics. Since Puerto Ricans ages 16 to 19 years living in Puerto Rico account for 14 percent of the Hispanic population in the United States (Puerto Ricans living on the continent account for another 10 percent of the Hispanic population) (U.S. Department of Commerce, 1993a, b), a significant part of the Hispanic population overall is not included in

Percentage of High School Graduates[1] Taking the SAT or ACT by State: 1996

States	Percentage taking SAT	Percentage taking ACT	States	Percentage taking SAT	Percentage taking ACT
National	41	35	Missouri	9	63
Alabama	8	57	Montana	21	54
Alaska	47	35	Nebraska	9	72
Arizona	28	27	Nevada	31	39
Arkansas	6	64	New Hampshire	70	3
California	45	11	New Jersey	69	2
Colorado	30	60	New Mexico	12	59
Connecticut	79	2	New York	73	16
Delaware	66	4	North Carolina	59	11
District of Columbia	50	5	North Dakota	5	77
Florida	48	34	Ohio	24	58
Georgia	63	16	Oklahoma	8	63
Hawaii	54	15	Oregon	50	11
Idaho	15	59	Pennsylvania	71	6
Illinois	14	67	Rhode Island	69	1
Indiana	57	19	South Carolina	57	13
Iowa	5	64	South Dakota	5	65
Kansas	9	70	Tennessee	14	77
Kentucky	12	62	Texas	48	30
Louisiana	9	73	Utah	4	66
Maine	68	2	Vermont	70	3
Maryland	64	9	Virginia	68	5
Massachusetts	80	5	Washington	47	15
Michigan	11	64	West Virginia	17	54
Minnesota	9	59	Wisconsin	8	63
Mississippi	4	68	Wyoming	11	64

[1] Based on number of high school graduates in 1996 as projected by the Western Interstate Commission for Higher Education and number of students in the class of 1996 who took the SAT or ACT.

NOTES: Puerto Rico is not included. A very low percentage of students may have taken both tests.

SOURCE: College Board (1996c) and American College Testing (1996).

this section. The number of high school graduates in Puerto Rico is increasing (in 1996, a total of 36,600 students graduated from both public and private high schools in Puerto Rico), and many of these graduates consider going to college and taking the SAT. The SAT-equivalent test administered in Puerto Rico by the College Board is given in Spanish; for academic year 1995–1996, 32,490 persons took the test, of whom 58 percent were women. Only about one-fourth of persons who took the test had a parent who had a college degree (College Board, 1995), so most of these students were the first generation in their families to go to college.

Increased Participation in College Admissions Test Taking

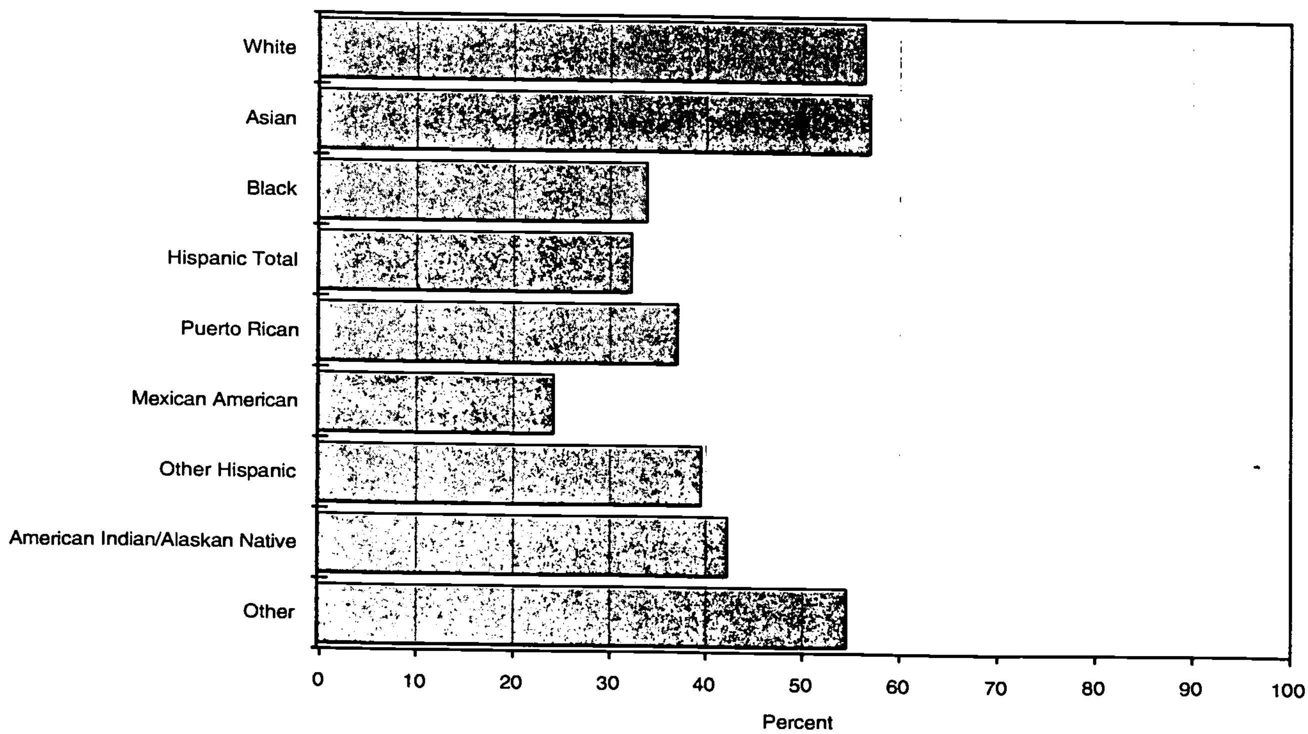
One of the major pieces of information derived from data on the ACT and SAT is that the number of high school seniors from underrepresented minority groups taking college admissions tests has increased significantly in the 1990s. Although the number of white students taking the SAT declined slightly (–1 percent) between 1991 and 1996, the number of minority students taking the test has increased 13 percent (the largest percentage increases were among Mexican American and Latin American students). (See appendix table 2-18.) During this same period, the number of ACT test takers increased 11 percent for whites and 29 percent for minority students. (See appendix table 2-19.)

The College Board data indicate that a higher proportion of underrepresented minorities make the decision to take a college admission test late in high school. Students who have plans for college early in high school often begin by taking a commercial "diagnostic SAT" in 10th grade, the PSAT in 11th grade, sometimes an SAT preparation class, and then the SAT in 11th grade and/or 12th grade. Parents play a major role in educating their children to this schedule and process, particularly if the parents have gone to college themselves. But college experience of parents varies greatly by racial/ethnic group, with blacks, Hispanics, and American Indians having the lowest percentages of parents with college degrees. (See figure 2-9.) Among these underrepresented groups, the majority of high school seniors taking the SAT are trying to be the first generation of their family to go to college. (See appendix table 2-20.)

Although guidance counselors and teachers in the schools may help some "first-generation" students

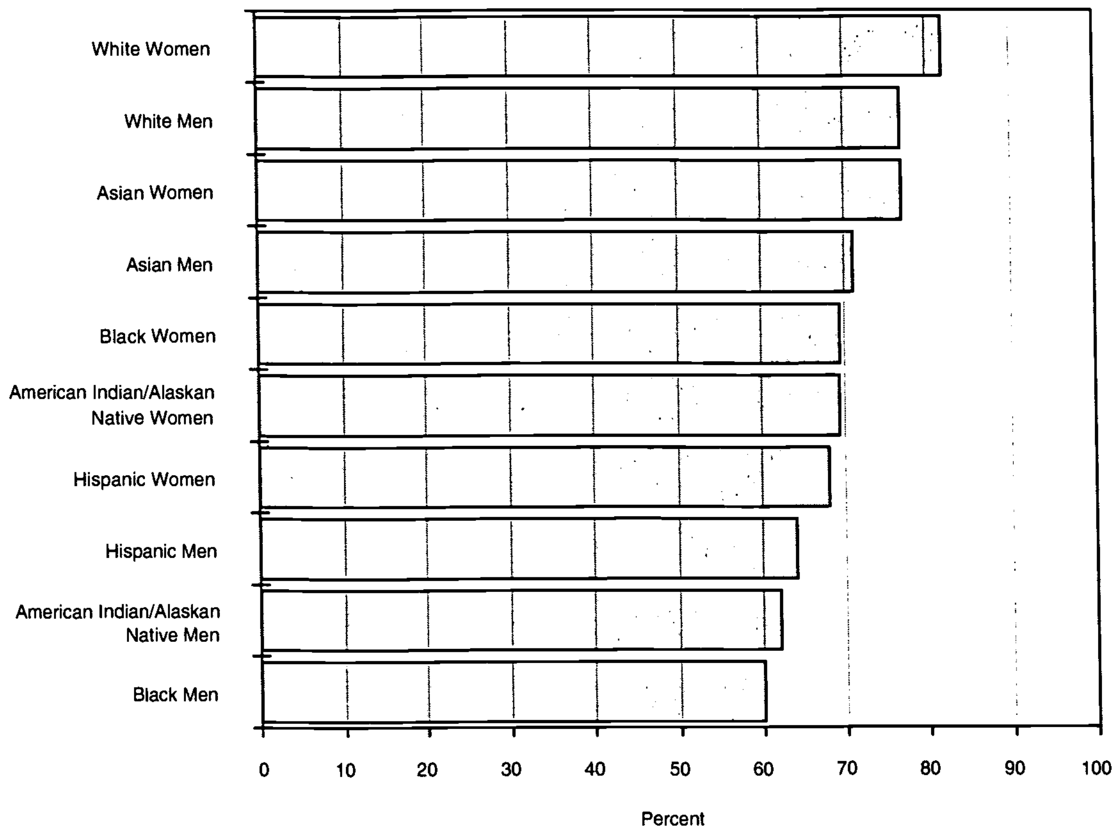
Figure 2-9.

Percent of SAT takers who have a parent with a college degree, by race/ethnicity: 1996



SOURCE: College Board, unpublished tabulations, 1996.

Figure 2-10.
Percent of 1996 SAT takers who took the PSAT, by race/ethnicity and sex



SOURCE: College Board, unpublished tabulations,1996.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

understand this process of planning for college, data on the percentage of SAT takers who had taken the PSAT earlier indicate that this process was not taking place for a higher percentage of students in these underrepresented groups. The students with the lowest percents who had taken the PSAT were Hispanic, American Indian, and black men; the next lowest percentages were among the women in these groups. (See figure 2-10.)

Increased Preparation for College

The American College Testing service has been tracking the percentage of their test takers who have taken core courses in high school: 4 years of English and 3 years each of mathematics, science, and social studies. The number of students who have taken at least a core curriculum in high school has been increasing greatly, from 51 percent in 1991 to 61 percent in 1996. Among underrepresented minorities, the increases have been significant also: for blacks—an increase from 45 to 55 percent of test takers; for American Indians—an increase from 40 to 49 percent; and for Hispanics—an increase from 49 to 56 percent. The increase for Asians was 64 to 71 percent of test takers (American College Testing, 1996).

Data on test takers by race are also available by family income. Average ACT scores for each racial/ethnic group are higher for those with core curriculum preparation, as would be expected; average scores also increase with family income. (See appendix table 2-21.)

College Credit From Advanced Placement

The number of high school students enrolling in AP courses and then taking AP tests for college credit has increased considerably in the last few years. Over half of the high schools in the United States offer AP college level classes; in 1996, over 500,000 students enrolled in AP classes. Of these, 40 percent qualified for college credit from their scores on AP exams taken in high school (College Board, 1996c).

Studies on the Effects of California Proposition 209, *Hopwood* v. *Texas*, and the Use of Test Scores on Student Access at Selective Colleges and Universities

A new study (Nettles and Perna, 1997) by the Frederick T. Patterson Research Institute of The College Fund/UNCF addresses this issue. The authors, Michael Nettles and Laura Perna, discuss the challenge of admissions tests in the admissions process. "The way colleges and universities treat admissions test scores, such as the Scholastic Assessment Test (SAT), the American College Test (ACT) and the Advanced Placement (AP) examinations, in the admissions process plays a vital role in the number of African Americans and Hispanics who are admitted and who enroll. The variety and range of criteria including admissions tests and other characteristics of individuals (e.g., geographic origin, alumni relations, educational and career aspirations, etc.), as well as the weight assigned to each criterion, is important" (p. 19). To understand the role of affirmative action, The Patterson Research Institute plans to study further a sample of highly competitive universities to understand the possible impact of California Proposition 209 and *Hopwood* v. *Texas* on diversity.[15]

The Educational Testing Service is also completing a study called "Hopwood, Bakke, and Beyond in College Admissions" (Educational Testing Service, 1997). If college admissions are based more on test scores as a result of these, and since underrepresented minorities constitute only 4.1 percent of students who scored 1200 or higher on the SAT, it is important to know more about the students scoring between 1000 and 1200 on the SAT. This study examines the "educational striver" student pool.

Continuing earlier studies by Claude Steele at Stanford University (see National Science Foundation, 1994, 1996), a new study describes how negative stereotypes are achievement barriers and how they shape the intellectual identity of women and minorities. Steele's research shows that this "threat dramatically depresses the standardized test performance of women and African-Americans who are in the academic vanguard of their groups (offering a new interpretation of group differences in standardized test performance)." He offers strategies for policy and practice in schools that can reduce the threats to stereotyped groups (Steele, 1997, p. 613).

[15] California Proposition 209 is a California constitutional amendment that prohibits State and local agencies including public colleges and universities from using preferences based on race or gender. *Hopwood* v. *Texas* ruled that race may not be used as a factor in admissions, and the Texas Attorney General ruled that the ban must also include financial aid, recruiting, and undergraduate admissions.

Of the subjects offered for AP exams, 12 are in science or mathematics. The AP courses with the highest number of underrepresented minorities enrolled were calculus AB and biology. The proportion of underrepresented minorities among the AP candidates in these two subjects was 9 percent for both; for chemistry and physics B, the representation was 8 and 7 percent, respectively. (See appendix table 2-22.)

According to the American Association of Collegiate Registrars and Admissions Officers (AACRAO), admissions officers are impressed by Advanced Placement course taking—even if the test is not taken. This importance makes it necessary to understand some of the differential opportunities for minority students to take the AP classes. The Advanced Placement at the College Board indicated that the schools that don't offer AP classes fall into four categories:

- small religious schools,
- small rural schools,
- schools in Wyoming, the Dakotas, and a few other States, and
- large urban schools, particularly if they feed into academic magnet schools.

Although the first three groups may affect large numbers of American Indians, these and the last category may affect large numbers of black and Hispanic students. Wade Curry, head of the AP at the College Board, explained that "magnet high schools draw off the most academically inclined students and produce fairly large numbers of AP scholars. But the schools they draw from then tend not to offer the courses, leaving those students behind." He has found that "African American students who do well on the AP tests tend to be either in the urban magnets or in predominantly white, suburban school systems where there are between five and twenty African American students who take the courses" (Chenoweth, 1997, p. 22).

Persons With Disabilities

Data on disability from the SAT and ACT are collected in two ways: from student questionnaires and from requests for special testing accommodations.

Text table 2-6.
Average SAT verbal and mathematics scores by disability status: 1996

Indicated a disability	Verbal average	Mathematics average
Yes (N=42,789)[1]	472	468
No (N=921,317)	509	512

[1] Includes those indicating blindness (5,548), deafness (3,262), paraplegia (167), learning disability (19,399), other neurological/orthopedic impairment (2,929), multiple disabilities (251), and "other" (11,233).

SOURCE: College Board, unpublished tabulations, 1996.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Student Questionnaires

When persons first register to take college placement exams, they are asked on the student questionnaires to (1) "Indicate any permanently disabling condition," with six response choices (SAT), or (2) "Please respond to this item only if you have a physical or diagnosed learning disability," with eight categories (ACT). The ACT states on the student questionnaire that the information is used by colleges only to provide financial aid and special services.

About 5 percent (over 40,000) of students taking the SAT in 1996 checked a category indicating a disability; the ACT also had 5 percent (almost 20,000) of students who indicated a disability category in 1996.

Text table 2-7.
Average ACT scores by disability status: 1996

Indicated permanent:	Average ACT score
Blindness (N=4,503)	17.2
Hearing impairment (N=10,039)	20.2
Learning disability (N=7,904)	16.1
Attention deficit disorder (N=10,483)	19.3
Other neurological disorder (N=1,347)	19.3
Require wheelchair access (N=360)	19.1
Other orthopedic (N=1,634)	20.3
Multiple disabilities (N=980)	19.8
Other (N=7,256)	17.8
Did not indicate disability	21.0

SOURCE: ACT, unpublished tabulations, 1996.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Among college-bound seniors in 1996 who indicated a disability and took the SAT, 51 percent were male and 49 percent female; underrepresented minorities accounted for 18 percent of those indicating a disability (compared with 21 percent for all college-bound seniors) (ACT and SAT, unpublished tabulations).

The average SAT scores in 1996 of those who indicated a disability were lower than those who did not. (See text table 2-6.)

Data from the ACT are reported according to the category of disability and show variability among the groups of students in terms of their average scores in 1996. (See text table 2-7.)

Special Testing Format/Conditions

Among SAT test takers, almost 20,000 students took the test under nonstandard conditions. These test takers had average scores (463 verbal and 452 mathematics) that were below the average of all test takers who indicated on the student questionnaire that they had a permanent disability yet did not request special testing formats (472 verbal and 468 mathematics) (College Board, unpublished data).

The ACT also has data available on the almost 20,000 students who requested special testing formats. (See text table 2-8.) Many of these students

Text table 2-8.
Number of students with disabilities taking the ACT test with special formats, by type of disability: 1996

Special tested students (ACT)	Number in 1996
Total based on disability	19,526
Learning disabled	4,426
Attention deficit disorder	4,358
Dyslexic	2,849
Developmental mathematics disorder	2,724
Developmental writing disorder	2,394
Visually impaired	870
Physically impaired	511
Deaf	499
Psychological disability	295
Anxiety disorder	226
Epilepsy	132
Tourette syndrome	81
Emotionally disabled	75
Other (cerebral palsy, homebound, etc.)	86

SOURCE: ACT, unpublished tabulations, 1996.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Equity, Fairness, and Educational Testing

Achievement test scores are only one of many factors used to predict success in higher education. Reliance on test scores in decisions about individual students or in policy decisions involving groups of students raises issues of equity and fairness in the educational system and in the distribution of "rewards" for achievement. The following quotation from a Congressional report indicates how issues of equity and fairness have been linked with tests and their results (U.S. Office of Technology Assessment, 1992).

Steven Jay Gould's ... treatise on the history of intelligence testing is dedicated to "...the memory of Grammy and Papa Joe, who came, struggled, and prospered, Mr. Goddard notwithstanding."[1] ... As Gould explains midway through the book, Goddard had been one of a handful of prominent American psychologists who used test data to advance racist, xenophobic, and eugenicist ideologies. Although Goddard himself later recanted,[2] ... the atmosphere of the 1920s and 1930s gave tests "...the rather happy property of being a conservative social innovation. They could be perceived as justifying the richness of the rich and the poverty of the poor; they legitimized the existing social order."[3]...

Testing policy arouses the passions of Americans concerned with equal opportunity and social mobility. As in the past, those passions run in both directions: everyone may agree that testing can be a wedge, but some see the wedge forcing open the gates of opportunity while others see it as the doorstop keeping the gates tightly shut.

Consider, for example, the following excerpts ... :

> ...minority youngsters who...are disproportionately among the poor, tend to be relegated to poor schools, or tracked out of academic courses, just as young women are not encouraged to take math and science. Therefore, the differences in the "group" scores [on the Scholastic Aptitude Test]...represent anything but "bias." Rather, the score is a faithful messenger of the unequal distribution in our country of educational resources and encouragement.[4]
>
> Test makers claim that the lower test scores of racial and ethnic minorities and of students from low-income families simply reflect the biases and inequities that exist in American schools and American society. Biases and inequities certainly exist—but standardized tests do not merely reflect their impact; they compound them.[5]

... Both sides appear to agree that tests can be used to identify inequalities in educational opportunies.[6] But the question becomes how to use that information. Advocates of testing as a "gatekeeper" argue that ability and achievement, rather than family background, class, or the specific advantages that might accrue to students in wealthy school districts, should govern the distribution of opportunities and rewards in society. Moreover, they add, this system of distribution creates incentives for school systems to provide their students with the best possible chances for success.

On the other hand, opponents contend that ability and achievement scores are highly correlated with socioeconomic background factors[7] and with the quality of schooling children receive;[8] under these circumstances, "...no assessment can be considered equitable for students if there has been differential opportunity to access the material upon which the assessment is based."[9]

This debate will not be resolved easily or quickly; nor will it become moot with the advent of alternative methods of assessment. On the contrary, it could very well become even more heated and complex.[10]

---

[1] Steven Jay Gould, *The Mismeasure of Man* (New York, NY: Norton, 1981), dedication, p. 7.

[2] See, e.g., Carl Degler, *In Search of Human Nature* (London, England: Oxford University Press, 1991).

[3] Sheldon White, "Social Implications of IQ," *The Myth of Measurability*, Paul Houts (ed.) (New York, NY: Hart Publishing Co., 1977), p. 38. See also Clarence Karier, "Testing for Order and Control in the Liberal Corporate State," *The IQ Controversy*, N. Block and G. Dworkin (eds.) (New York, NY: Random House, 1976), pp. 339–373. Karier's basic argument, as summarized by another historian of testing, was "...the tests...were biased in terms of social class, economic, cultural, and racial background. Their use in schools served to block opportunity for the lower classes and immigrants...[and fashion] a system of tracking in the schools that reinforced social inequality..." Paul Chapman, *Schools as Sorters* (New York, NY: New York University Press, 1988), p. 8. For opposing viewpoints see, e.g., Mark Snyderman and Stanley Rothman, *The IQ Controversy* (New Brunswick, NJ: Transaction Books, 1988); Arthur Jensen, *Bias in Mental Testing* (New York, NY: Free Press, 1980); or Richard Herstein, "IQ," *Atlantic Monthly*, vol. 228, September 1971, pp. 43–64.

[4] Donald Stewart, president, College Entrance Examination Board, "Thinking the Unthinkable: Standardized Testing and the Future of American Education," speech before the Columbus Metropolitan Club, Columbus, OH, Feb. 22, 1989.

Equity, Fairness, and Educational Testing *(continued)*

[5] Monty Neill and Noe Medina, "Standardized Testing: Harmful to Educational Health," *Phi Delta Kappan*, Vol. 70, No. 9, May 1989, p. 691.

[6] For discussion of test bias and the effects of testing on minority students, see e.g., Walter Haney, Boston College, "Testing and Minorities," draft monograph, January 1991, p. 24.

[7] See, e.g., Christopher Jencks et al. *Inequality* (New York, NY: Basic Books, 1972).

[8] See, e.g., Ronald Ferguson, "Paying for Public Education: New Evidence on How and Why Money Matters," *Harvard Journal on Legislation*, Vol. 28, No. 2, Summer 1991, pp. 465–498.

[9] Shirley Malcom, "Equity and Excellence Through Authentic Science Assessment," *Science Assessment in the Service of Reform*, Gerald Kulm and Shirley Malcom (eds.) (Washington, DC: American Association for the Advancement of Science, 1991), p. 316. It is interesting to note that standardized test scores, viewed by some critics as blocking entry to education and work opportunities, have been used to justify major public programs to help minority and disadvantaged children: "...the preeminent example...was in the 1960s, when lower performance of minority and inner city children was used to bolster arguments for the war on poverty and to help propel passage of the landmark Elementary and Secondary Education Act of 1965..." (Haney, op. cit., footnote 7, p. 22.)

[10] Some minority educators, for example, fear that new assessment methods will stifle opportunities for minority students who have recently begun to do better on conventional tests. There is also uncertainty over whether or not tests should be used for placing children in remedial programs. Parents in California sued recently, not because their children were being tested but, on the contrary, because the State had followed the precedent set in the landmark *Hobson* v. *Hansen* case, and banned testing as a basis for diagnosing learning difficulties and placing children in remedial tracks. For further discussion of this and other legal issues, see ch. 2 [of source report].

do not fill out student questionnaires and, therefore, may not be included in the data presented above. Data from ACT on special testing formats are not nationally representative of any of the disability categories and do not include all students with disabilities (many of whom took the regular administration of the test). Still, it is interesting to note the variety of conditions of students who were taking the college placement tests under special testing administration (ACT, 1996, unpublished tabulations).

Students who take the ACT under special administration to accommodate a disability are often flagged as such when their test scores are provided to college admissions offices. The College Board funded a study on how the admissions process may be affected by these flags, as well as the validity of admissions tests scores for disabled applicants. The main finding of that study was that students with disabilities were admitted on much the same basis as the other applicants, though in some instances particular groups of applicants were somewhat less likely to be admitted than would be expected (learning disabled) or somewhat more likely to be admitted (for example, hearing impaired) to special programs. The report also states that "Admissions decisions predicted on the basis of either SAT or HSG (high school grades) correlated slightly less with actual decisions in the case of handicapped applicants than others. This result suggests that factors other than SAT and HSG play a slightly larger role in the case of handicapped applicants, though not necessarily to their advantage" (Willingham, 1988, p. 81).

Advanced Placement Exams do not collect data from the students on any possible disability. If requested and approved, however, AP exams are offered at the high school site in a variety of testing alternative procedures, which include special arrangements, extended time, use of a reader or sign language interpreter, or special test editions (for example, Braille, cassette, photo-enlarged). Students must have official certification of their disability on file at the school to verify the need for special testing arrangements. The number of AP science exams taken in May 1997 under special testing arrangements were

Biology	267
Chemistry	112
Physics B	55
Physics A	50

Note that these numbers would not include the disabled students who took AP exams under regular testing conditions.

References

American College Testing. 1996. *1996 Results, Summary Reports*. Iowa City: American College Testing Program.

Barabas, Christine. 1990. *Technical Writing in a Corporate Culture: A Study of the Nature of Information*. Norwood, NJ: Ablex Publishing.

Barbett, Samuel F., and Roslyn A. Korb. 1997. *Enrollment in Higher Education: 1995* (NCES 97-440). Washington, DC: U.S. Government Printing Office.

Baugher, Eleanor, and Leatha Lamison-White. 1996. *Poverty in the United States: 1995* (Current Population Reports, Series P60-194). Washington, DC: U.S. Department of Commerce, U.S Bureau of the Census.

Beaton, Albert E., Michael O. Martin, Ina V.S. Mullis, Eugenio J. Gonzalez, Teresa A. Smith, and Dana L. Kelly. 1996a. *Science Achievement in the Middle School Years: IEA's Third International Mathematics*

and Science Study. Boston: Center for the Study of Testing, Evaluation, and Educational Policy, Boston College.

Beaton, Albert E., Ina V.S. Mullis, Michael O. Martin, Eugenio J. Gonzalez, Dana L. Kelly, and Teresa A. Smith. 1996b. *Mathematics Achievement in the Middle School Years: IEA's Third International Mathematics and Science Study.* Boston: Center for the Study of Testing, Evaluation, and Educational Policy, Boston College.

Bridgeman, B., and C. Wendler. 1991. Gender Differences in Predictors of College Mathematics Performance and in College Mathematics Course Grades. *Journal of Educational Psychology,* 83, 275-284.

Campbell, Jay R., Clyde M. Reese, Christine O'Sullivan, and John A. Dossey. 1996. *NAEP 1994 Trends in Academic Progress.* Washington, DC: U.S. Department of Education, National Center for Education Statistics.

Chenoweth, Karin. 1997. A measurement of what? *Black Issues in Higher Education,* 14(14), 18-25.

Cole, Nancy S. 1997. *The ETS Gender Study: How Females and Males Perform in Educational Settings.* Princeton, NJ: Educational Testing Service.

Coley, Richard, John Cradler, and Penelope K. Engel. 1997. *Computers and Classrooms: The Status of Technology in U.S. Schools.* Princeton, NJ: Educational Testing Service.

College Board. 1995. *Suplemento Estadistico.* New York: The College Board, pp. 30-31.

College Board. 1996a. *Profile of College-Bound Seniors National Report.* New York: The College Board.

College Board. 1996b. *1996 Advanced Placement Program National Summary Reports.* New York: The College Board, pp. 3-5.

College Board. 1996c. "Academic Preparation for College on the Rise" (press release, August 22, 1996). New York: The College Board.

College Board. 1996d. *What You Need to Know About Recentering SAT Scores.* New York: The College Board. [Pamphlet]

College Board. 1997a. SAT Program, "Common Sense About SAT Score Difference and Test Validity" (Research Notes, RN-01, June). New York: The College Board.

College Board. 1997b. "Minorities Register Solid Gains in College Enrollment According to College Board Survey" (press release, March 21, 1997). New York: The College Board.

Day, Jennifer, and Andrea Curry. 1996. *Educational Attainment in the United States: March 1995* (Current Population Reports, Series P20-489). Washington, DC: U.S. Department of Commerce, U.S Bureau of the Census.

Educational Testing Service. 1997. Hopwood, Bakke and Beyond in College Admissions: "Educational Striver" Study. Paper presented at the American Association of College Registrars and Admissions Officers Policy Summit, Washington, DC, September 1997.

Ekstrom, R.B., M.E. Goertz, and D. Rock. 1988. *Education and American Youth.* Philadelphia: The Falmer Press.

Gallup International Institute. 1996. *Survey of High School Seniors, The Decision to Go to College.* New York: The College Board.

Healy, Patrick. 1997. Court Faults Miss. Universities for Basing Aid on Test Scores. *The Chronicle of Higher Education,* 43(34), A32.

Heaviside, Sheila, Toija Riggins, and Elizabeth Farris. 1997. *Advanced Telecommunications in U.S Public Elementary and Secondary Schools, Fall 1996* (NCES 97-944). Washington, DC: U.S. Government Printing Office.

Henke, Robin R., Susan B. Choy, and Sonya Geis. 1996. *Schools and Staffing in the United States: A Statistical Profile, 1993-94* (NCES 96-124). Washington, DC: U.S. Department of Education, National Center for Education Statistics.

Hernandez, Michelle A. 1997. *A is for Admission: The Insider's Guide to Getting into the Ivy League and Other Top Colleges.* New York: Warner Books.

Kim, Heather. 1997. *Diversity Among Asian American High School Students.* Princeton, NJ: Educational Testing Service.

Kimel, William R., and Melford E. Monsees. 1979. Engineering Graduates: How Good Are They? *Engineering Education,* 70(2), 210-212.

Laosa, Luis. 1997. *School Segregation of Children Who Migrate to the United States from Puerto Rico.* Princeton, NJ: Educational Testing Service.

LeBold, William K. 1997. Women in Engineering and Science: An Undergraduate Research Perspective.

In Linda Dix (Ed.), *Women: Their Underrepresentation and Career Differentials in Science and Engineering, Proceedings of a Workshop.* Washington, DC: National Academy Press.

Madigan, Timothy. 1997. *Science Proficiency and Course Taking in High School: The Relationship of Science Course-Taking Patterns to Increases in Science Proficiency Between Eighth and Twelfth Grades* (NCES 97-838). Washington, DC: U.S. Department of Education, National Center for Education Statistics.

Martin, Michael O., Ina V.S. Mullis, Albert E. Beaton, Eugenio J. Gonzalez, Teresa A. Smith, and Dana L. Kelly. 1997. *Science Achievement in the Primary School Years: IEA's Third International Mathematics and Science Study.* Boston: Center for the Study of Testing, Evaluation, and Educational Policy, Boston College.

McMillan, Marilyn, and Phillip Kaufman. 1997. *Dropout Rates in the United States: 1995* (NCES 97-473). Washington, DC: U.S. Government Printing Office.

Miller, Julie A. 1997. A Part of the World, *Education Week,* 16(35), 28-34.

Mullis, Ina V.S., Michael O. Martin, Albert E. Beaton, Eugenio J. Gonzalez, Dana L. Kelly, and Teresa A. Smith. 1997. *Mathematics Achievement in the Primary School Years: IEA's Third International Mathematics and Science Study.* Boston: Center for the Study of Testing, Evaluation, and Educational Policy, Boston College.

National Center for Fair & Open Testing. 1997. *Scores Are Optional for Admission Into Bachelor Degree Programs.* Cambridge, MA: National Center for Fair & Open Testing. [Pamphlet]

National Education Goals Panel. 1997. *The National Education Goals Report: 1997.* Washington, DC: National Education Goals Panel.

National Research Council. 1997. *More Than Screen Deep: Toward Every-Citizen Interfaces to the Nation's Information Infrastructure.* Washington, DC: National Academy Press.

National Science Board. 1996. *Science and Engineering Indicators: 1996* (NSB 96-21). Washington, DC: U.S. Government Printing Office.

National Science Board. 1998. *Science and Engineering Indicators: 1998* (NSB 98-1). Washington, DC: U.S. Government Printing Office.

National Science Foundation. 1994. *Women, Minorities, and Persons With Disabilities in Science and Engineering: 1994* (NSF 94-333). Arlington, VA: National Science Foundation.

National Science Foundation. 1996. *Women, Minorities, and Persons With Disabilities in Science and Engineering: 1996* (NSF 96-311). Arlington, VA: National Science Foundation.

Nettles, Michael T., and Laura W. Perna. 1997. *The Role of Affirmative Action in Expanding Student Access at Selective Colleges and Universities.* Fairfax, VA: Frederick D. Patterson Research Institute of The College Fund.

Oakes, Jeannie. 1990. *Multiplying Inequalities: The Effects of Race, Social Class, and Tracking on Opportunities to Learn Mathematics and Science.* Santa Monica, CA: The RAND Corporation.

Olson, John, and Arnold Goldstein. 1996. *Focus on NAEP: Increasing the Inclusion of Students With Disabilities and Limited English Proficient Students in NAEP* (NCES 96-894). Washington, DC: U.S. Department of Education, National Center for Education Statistics.

O'Sullivan, Christine Y., Clyde M. Reese, and John Mazzeo. 1997. *NAEP 1996 Science Report Card for the Nation and the States* (NCES 97-497). Washington, DC: U.S. Department of Education, National Center for Education Statistics.

Peak, Lois. 1997. *Pursuing Excellence: Initial Findings from the Third International Mathematics and Science Study* (NCES 97-198). Washington, DC: U.S. Government Printing Office, National Center for Education Statistics.

Peng, Samuel S., Dee Ann Wright, and Susan T. Hill. 1997. *Understanding Racial-Ethnic Differences in Secondary School Science and Mathematics Achievement* (NCES 95-710). Washington, DC: U.S. Department of Education, National Center for Education Statistics.

Ponessa, Jeanne. 1997. Return of the Native. *Education Week,* 16(37), 38-43.

Quality Education Data. 1997. *Technology in Public Schools* (15th ed.). Denver, CO: Quality Education Data.

Reese, C.M., K.E. Miller, J. Mazzeo, and J.A. Dossey. 1997. *NAEP 1996 Mathematics Report Card for the Nation and the States* (NCES 97-488). Washington, DC: U.S. Department of Education, National Center for Education Statistics.

Rodriguez, Carlos. 1993. Minorities in Science and Engineering: Patterns for Success. (PhD dissertation, University of Arizona, Tucson, Arizona.)

Rossi, Robert, Jerald Herting, and Jean Wolman. 1997. *Profiles of Students With Disabilities as Identified in NELS:88* (NCES 97-254). Washington, DC: U.S. Department of Education, National Center for Education Statistics.

Smith, Thomas M., Beth Aronstamm Young, Susan B. Choy, Marianne Perie, Nabeel Alsalam, Mary R. Rollefson, and Yupin Bae. 1996. *The Condition of Education 1996* (NCES 96-304). Washington, DC: U.S. Government Printing Office.

Smith, Thomas M., Beth Aronstamm Young, Yupin Bae, Susan B. Choy, and Sonia Geis. 1997. *The Condition of Education 1997* (NCES 97-388). Washington, DC: U.S. Government Printing Office.

Snyder, Thomas D., Charlene M. Hoffman, and Claire M. Geddes. 1998. *Digest of Education Statistics* (NCES 98-015). Washington, DC: U.S. Government Printing Office.

Steele, Claude M. 1997. A Threat in the Air: How Stereotypes Shape Intellectual Identity and Performance. *American Psychologist*, 52(6), 613-629.

U.S. Congress, Office of Technology Assessment. 1992. *Testing in American Schools: Asking the Right Questions* (OTA-SET-519). Washington, DC: U.S. Government Printing Office.

U.S. Department of Commerce, Bureau of the Census. 1993a. *1990 Census of Population, Social and Economic Characteristics, Puerto Rico* (1990 CP-2-53). Washington, DC: U.S. Government Printing Office.

U.S. Department of Commerce, Bureau of the Census. 1993b. *1990 Census of Population, Social and Economic Characteristics, United States* (1990 CP-2-1). Washington, DC: U.S. Government Printing Office.

U.S. Department of Education, Office of Special Education Programs. 1991. *Youth With Disabilities: How Are They Doing? The First Comprehensive Report From the National Longitudinal Study of Special Educational Students*. Menlo Park, CA: SRI International.

U.S. Department of Education, Office of Special Education and Rehabilitative Services. 1996. *Eighteenth Annual Report to Congress on the Implementation of the Individuals With Disabilities Education Act*. Washington, DC: U.S. Department of Education.

U.S. Department of Education, Office of Special Education and Rehabilitative Services. 1997. *Nineteenth Annual Report to Congress on the Implementation of the Individuals With Disabilities Education Act*. Washington, DC: U.S. Department of Education.

Wainer, H., and L.S. Steinberg. 1992. Sex Differences in Performance on the Mathematics Section of the Scholastic Aptitude Test: A Bidirectional Validity Study. *Harvard Educational Review*, 62, 323-336.

Weiss, Iris R. 1994. *A Profile of Science and Mathematics Education in the United States: 1993*. Chapel Hill, NC: Horizon Research.

Willingham, Warren W. 1988. Admissions Decisions. In Warren W. Willingham et al. (Eds.), *Testing Handicapped People*. Needham, MA: Allyn and Bacon.

CHAPTER 3

THE UNDERGRADUATE EXPERIENCE IN SCIENCE, MATHEMATICS, AND ENGINEERING

The underrepresentation of women, minorities, and persons with disabilities in most areas of scientific and technical endeavors is an issue of continuing concern to educators, employers, and those organizations responsible for sponsoring research and development activities. Although the number of women graduating with bachelor's degrees from some scientific fields equals or exceeds the number of men, in many fields there are far fewer women than could be expected from their number in the general population or on college and university campuses (see "Indices of Representation" on page 63). Since 1989, the number of underrepresented minorities earning bachelor's degrees in science, mathematics, and engineering (SME) has risen each year. Underrepresented minorities earned over 17 percent of the total number of undergraduate SME degrees awarded in 1995, up from 12 percent in 1989. (See appendix table 3-1.) The continuing differences in the enrollment and graduation rates of different racial/ethnic groups in science, mathematics, and engineering at the undergraduate level need to be better understood.

This chapter examines factors that influence access, achievement, and educational outcomes for women, minorities, and persons with disabilities who attend 2-year and 4-year institutions. This review of undergraduate education looks at changes in enrollment, course-taking patterns, and outcomes over the past few decades at all institutions of higher learning. It examines patterns of courses taken and outcomes (degrees awarded, attrition) by age, race/ethnicity, and major. An examination of these factors provides a greater understanding of the reasons that disparity among groups entering the fields of science, mathematics, and engineering has persisted.

Persistent Disparity in Science, Mathematics, and Engineering

Since 1980, more women than men have enrolled in college, and since 1982, women have earned more undergraduate degrees than have men. In 1995, women constituted 49 percent of the U.S. population ages 18 to 24 and earned 55 percent of all bachelor's degrees awarded, up from 43 percent in 1966. (See appendix tables 3-2 and 3-3.)

Women

Despite impressive gains, the participation of women in the physical sciences, mathematics, and engineering still lags significantly behind that of white men and Asians, as evidenced by the following:

- Women accounted for 35 percent of the bachelor's degrees awarded in the physical and earth sciences, up from 14 percent in 1966.
- Approximately 1 in 6, or 17 percent, of engineering bachelor's degrees were awarded to women in 1995, an increase from less than 1 percent of the total in 1966.
- Women were awarded 35 percent of the bachelor's degrees in mathematics and computer science in 1995, a slight increase over 1966.

Women are, however, as well or more highly represented than men in some science fields. For example, they earned nearly half of the bachelor's degrees awarded in 1995 in the biological/agricultural sciences and social sciences and 73 percent of the degrees in psychology. (See appendix table 3-2.)

Systematic data on minority participation in science, mathematics, and engineering education have been collected only since the late 1970s. (See appendix tables 3-4 and 3-5.) The bulleted data below show disparities persisting over time. Recent studies provide insight into the role that precollege preparation, self-confidence, work and family, availability of role models, peer support, and teaching methods play in maintaining that disparity.

Loss of Confidence as a Cause of Field Switching Among Undergraduate Women in Science, Mathematics, and Engineering Majors

A recent study shows that many young women bring to their experience of science, mathematics, and engineering (SME) disciplines a pattern of socialization that is entirely different from that of young men. Many aspects of SME majors, which have evolved largely to meet the educational needs of young men, force women into conflict with their own socialization experiences. The resolution of these conflicts is sometimes accomplished by leaving the major, sometimes by making personal adjustments to the dominant male social system.

Broadly speaking, men experience a life-long pressure to manifest an intrinsic sense of self-worth, to respond to challenge with displays of self-sufficiency and stoicism, and to show independence from the need for nurturing. By contrast, the socialization of young women (including their formal education) is biased toward the development of an extrinsic sense of identity. From earliest childhood, throughout the years of formal education, girls are encouraged to perform for the approval of others and to attach feelings of confidence and self-worth to signs that others are pleased by what they do. The degree to which any woman depends on others for her sense of achievement varies according to the mixture of cultural influences that constitute her socialization experiences. The tendency to perform for others is not gender-exclusive: depending on the circumstances of their upbringing and education, young men may also exhibit this trait. One important exception was found to be black women, who reflected a pattern of socialization that encouraged an independent self-image, self-reliance, and assertiveness in getting educational needs met. These women were distinctively inner-directed, compared with other women and most black men.

A pattern of performing for others—with negative consequences for persistence—appeared in several aspects of the study data. Many more women than men reported that they had chosen SME majors at the prompting of family or teachers, rather than for reasons of field or career interest.[1] Choices made primarily to please someone else did not withstand the rigors of an SME major and made students vulnerable to the attractions of other fields.

The study found a difference in the approach to education among young men and young women. An example is their different reasons for disliking large introductory classes. Men disliked them because they "have negative effects on grades," encourage "more competition for grades," and "are usually taught by less qualified faculty." Women disliked large classes because "you don't get to know the professor," "it's too impersonal," and "the professor doesn't care if you learn or attend class." These differences in judgments also suggest that women were more likely to enter college expecting to establish individual teacher-learner relationships.

This expectation was also reflected in the definitions of "good" and "bad" teachers offered by male and female students. Women commonly stressed the importance of a teacher's personal behavior toward them and defined the "bad" teacher as "unapproachable," "impersonal," and "intimidating." Good teachers were seen as "approachable," "friendly," and "patient"; they "really care about you, and want you to learn." Men were less concerned with faculty's openness to student contact than with their effectiveness in presenting the material.

Being raised to work for the approval of others explains why many women enter college without a clear view of what they want from their education and also why the openness of faculty to student contact is so central to many women's definition of the good teacher. For these women, engaging the teacher in a personal dialogue is critical both to the ease with which they can learn and to their level of confidence about their academic performance. The reluctance of many faculty to be drawn into pedagogical or advisory relationships with individual students is a major factor in the decision of many able young women to leave SME majors.[2]

The observations of the students in this study may offer a way to explain the recurrent finding of lowered confidence and self-esteem noted in other studies (Hall and Sandler, 1982; Ware and Dill, 1986; Arnold, 1987; Manis et al. 1993; see also reviews of this literature in Kimball, 1989 and Oakes, 1990). A female student whose confidence in her ability to do

[1] The stronger tendency of women to be drawn into SME majors through the influence of others was also found by Strenta et al. (1993).

[2] Manis, Sloat, Thomas, and Davis (1989) also found the "impersonality" of science and mathematics classes to be more problematic for women than for men.

Loss of Confidence as a Cause of Field Switching Among Undergraduate Women in Science, Mathematics, and Engineering Majors *(continued)*

mathematics and science is overdependent on the judgments of others, does not know how to assess the adequacy of her performance. Her self-confidence may be already shaken by her abrupt reduction in status. In high school, she was treated as special; now, she is part of a minority who are often treated with a perceived hostility that she cannot explain. The consequence for some women is confusion, anxiety, and a strong sense of abandonment. In the study one young woman stated

> Some of my girlfriends and I used to take it really hard when we didn't seem to do so well—you know—hiring tutors, and just struggling and crying over grades—getting out old tests and working extra problems, and making flash cards, and just working extra, extra hard. And it was all because, as hard as we tried, we just could not seem to please the professors. We were just looking for some encouragement.... I used to get nauseated before exams. It took me a long time to get over that.... Eventually, I learned not to take it to heart. It's not you they're grading: it's just your work—and not always that. Men just blow it off. (Female white mathematics non-switcher)

Even when their performance is adequate or good, teacher-dependent students (whether women or men) have difficulty in motivating themselves and in knowing that they are "doing okay" without faculty reassurance. Some of the nonswitching seniors described how difficult it had been to forego the high level of interaction and support to which they had been accustomed throughout their earlier school years. Learning to develop an independent sense of their own ability and progress had been vital to their survival.

> One reason I did well in high school is because I cared about what the teachers thought about me. I knew I was doing well when people were pleased with me. I was always looking for that praise just so I knew I was doing okay. It took me a long time to get over that...I used to get very upset because, here, the teacher doesn't know who you are. (Female white engineering switcher)

Depending on teachers for performance evaluation, reassurance about progress, and as the basis for motivation, constitutes a serious handicap for the many women who enter college having learned how to learn in this manner. Persistence initiatives which do not take this into account simply will not be effective. Looking to a teacher for interpretation and validation of their academic performance is a learned dependence which people can change, or outgrow, but not without first experiencing anxiety and frustration which, for some, ends in field switching. To a much higher degree than is the case for young men, preserving the self-confidence which young women bring into college depends on periodic reinforcement by faculty. To be faced with the prospect of four years of relative isolation and perceived male hostility on the one hand, and the abrupt withdrawal of familiar sources of praise, encouragement, and reassurance by faculty on the other, is the most common reason for the loss of self-confidence that makes able women in the sciences and engineering vulnerable to field switching.

— Adapted from Elaine Seymour and Nancy M. Hewitt, *Talking About Leaving: Why Undergraduates Leave the Sciences* (Westview Press, 1997)

Blacks

- In 1995, blacks, 12 percent of the total U.S. population, earned just over 7 percent of all bachelor's degrees and almost 7 percent of all science, mathematics, and engineering bachelor's degrees awarded in 1995, up slightly from 1989.
- Black women have greater representation than black men, earning over 4 percent of all undergraduate degrees and just over 4 percent of all science, mathematics, and engineering undergraduate degrees awarded in 1995.
- Black men earned over 2 percent of all degrees awarded and almost 3 percent of science, mathematics, and engineering degrees.

Hispanics

- Hispanic men and women make up 10 percent of the U.S. population and earned almost 6 percent of all bachelor's degrees awarded in 1995 and over 5 percent of all undergraduate degrees awarded in science, mathematics, and engineering in that year.
- Hispanic women had slightly higher numbers than Hispanic men, earning over 3 percent of all bachelor's degrees and slightly less than 3 percent of science, mathematics, and engineering degrees awarded in 1995.

Asians

- Asian men and women, who constitute 3 percent of the total U.S. population, continue to be well represented in science, mathematics, and engineering earning over 7 percent of all science, mathematics, and engineering bachelor's degrees awarded in 1995.
- White males earned 58 percent of the degrees in engineering; Asian men earn the second highest percentage with almost 16 percent of the bachelor's degrees.
- Asian women earned slightly over 3 percent of all science, mathematics, and engineering degrees in 1995 but slightly over 13 percent of the engineering degrees earned by women.

American Indians

- The total number of bachelor's degrees awarded to American Indians is relatively

American Indians in Higher Education

Data presented elsewhere in this chapter and the appendix (see "Technical Notes to Chapter 3" and appendix A) show American Indians have the lowest rates of enrollment in and graduation from both 2-year and 4-year undergraduate institutions. Interestingly, the index of representation in text table 3-1 shows that the proportion of American Indian females in college is higher than their proportion in the general population. Together, American Indian males and females earn fewer than 1 percent of bachelor's degrees awarded in all fields.

During the 30 years since Dineh College (formerly Navajo Community College), located in the heart of the Navajo Reservation, was founded, the number of tribal colleges has increased to 30 in 12 States. These colleges now enroll approximately 27,000 students. As Boyer notes, the possibility of American Indian participation in higher education is enhanced by the existence of these tribal colleges.

According to the Carnegie Foundation report, "Isolated by distance and culture, many [American Indians] have come to accept that they cannot complete school. College seems to many American Indians an impossible dream. Tribal colleges offer hope in this climate of despair...without sacrificing academic rigor, courses are often tailored to reflect the unique learning styles of American Indian students." (Boyer, 1977, p. 4)

Tribal colleges have become an integral part of the larger system of higher education for American Indians. Succeeding at a tribal college also appears to encourage students to continue their education and leads to increased employment opportunities.

Although no reliable studies have yet been done about graduation rates from tribal colleges, some tribal college presidents estimate that between 25 and 33 percent of students who enroll eventually receive a certificate or degree (Boyer, 1997). A survey of more than 500 graduates of Turtle Mountain College from 1980 to 1990 found that most graduates were either working or going to school. Fewer than 13 percent were unemployed, which "is in sharp contrast to the total rate of unemployment among Indian people." (Boyer, 1997, p. 68)

Research funded by the Alfred P. Sloan Foundation examined the experience of American Indians majoring in math, science, engineering, or business (McAfee, 1977). The phenomenon of stepping into, out of, and back into higher education emerged as a typical mode of college attendance. Strength of cultural identity had a significant impact on persistence and outcome of undergraduate education. McAfee's findings about the relationship between cultural identity and persistence to degree attainment reinforce the importance of tribal colleges for American Indians in higher education. In addition, McAfee's work suggests that the phenomenon of stepping out is a norm that needs to be better understood and accommodated by institutions of higher education.

small, less than one percent. The trend in number of degrees awarded in science, mathematics, and engineering has been increasing for American Indians at a rate similar to the total population.

Patterns of overrepresentation and underrepresentation of the racial/ethnic and gender groups were analyzed in more detail. To measure the extent to which the various groups were overrepresented, at parity, or underrepresented in the college population, an index of representation (IR) was computed. (See "Technical Notes to Chapter 3" for details.)

The IR for total college enrollment indicates that in 1980 white males and females, Asian males and females, and American Indian females had higher proportions among persons enrolled in college than they had among the general population of 18- to 24-year-olds. Asian males and females had the highest index scores. (See figure 3-1, text table 3-1, and appendix tables 3-6, 3-7, 3-8, and 3-9.) In 1980, black males and females, Hispanic males and females, and American Indian males were underrepresented in the college population. Hispanic males and black males had the lowest index scores. The IR score for American Indian females in 1980 indicates that their representation in the college population was higher than their representation in the general population.

Between 1980 and 1990, except for white females, persons from all racial/ethnic and gender categories were less represented in the college population than in the general population. After 1990, the representation scores of both white males and females decreased while those of the other categories increased. Racial/ethnic minorities have improved their representation in higher education. Black females had almost achieved parity by 1994. Their IR score in 1994 was essentially equal to that of white males whose proportional representation in the college population has systematically decreased below parity. On the other hand, Asian males and females, white females, and American Indian females continued through the beginning years of the 1990s to be overrepresented in the college population. The rate of improvement among black males has been slower than that of the other groups that improved. Hispanic males have caught up with black males in their proportional representation in the college population.

Sources of Persistent Disparity

New research is beginning to identify reasons why more women, minorities, and persons with disabilities do not enroll in or receive bachelor's degrees in science, mathematics, and engineering. Astin and Sax (1996) cite the importance of role models, peer groups, curriculum pedagogy, and faculty attitudes in the process of developing scientific talent in undergraduate women. Seymour and Hewitt (1997) have argued that problems arising from the nature of the undergraduate experience and the culture of the scientific or engineering discipline (for example, attitudes and practices of the faculty) at the undergraduate level have a significant impact on whether women and minorities stay in science, mathematics, and engineering or switch to other majors. Hanson (1997) found that pervasive gender discrimination still exists at all levels of education and that race and class have a significant impact on success in science.

Two-Year Institutions

Community colleges and 2-year colleges have assumed an increasingly important role in postsecondary education. These institutions now meet many needs, serving those who want to complete requirements for a high school diploma, try out college-level coursework before transferring to a 4-year college, or take job-related courses (Adelman 1997).

The changing role of the community college is not revealed by enrollment statistics alone. Over the past three decades, community colleges have consistently accounted for just under one-quarter of all course enrollments (Adelman 1995). Community colleges attract more minority (particularly Hispanic) and low- to moderate-income students, veterans, and those students with lower grade-point averages and SAT scores.

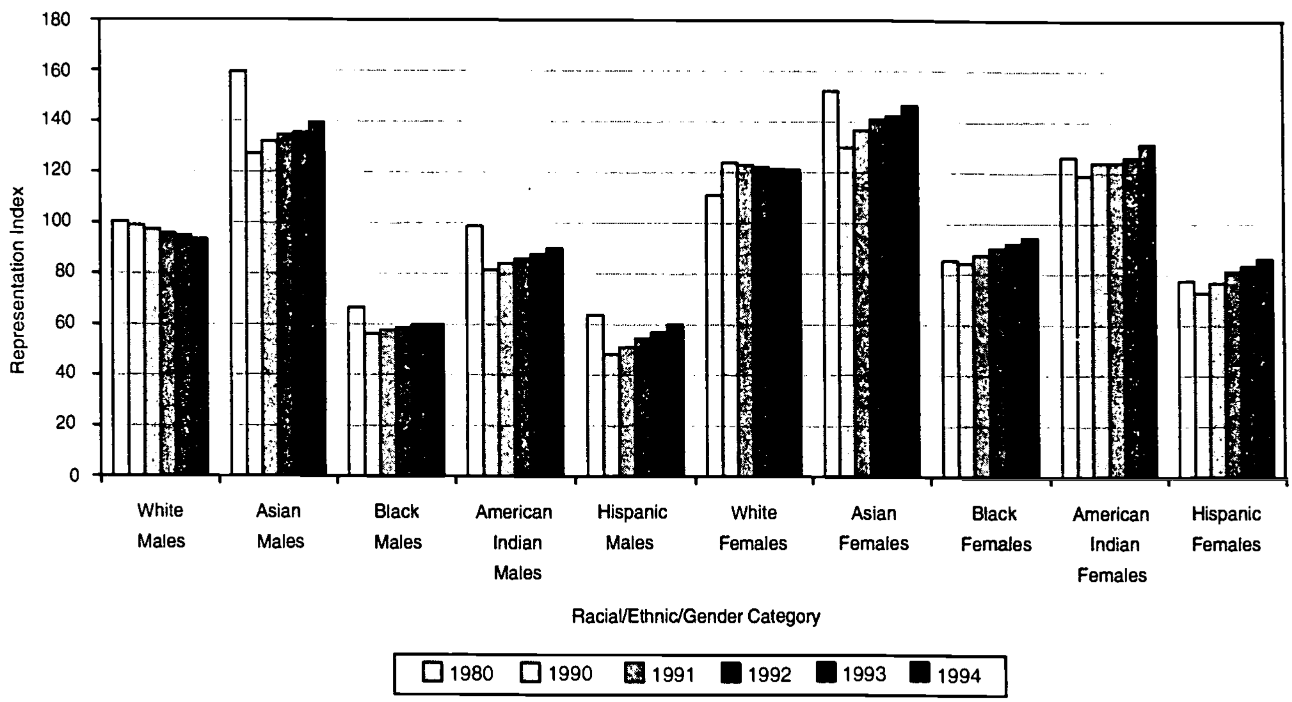
Some interesting differences in course participation patterns between 2-year and 4-year institutions emerged in an analysis conducted by Clifford Adelman of the U.S. Department of Education. According to Adelman, the most traditional way of assessing rates of participation in a field is to ask what proportion of students from a given group takes—and successfully completes—key courses in that field. Where there are considerable differences among groups, what are the reasons for those differences? Some answers may point to factors that cannot be changed, whereas others suggest strategies for better advisement and pre-college education.

Among those students who primarily attend 4-year institutions (see appendix table 3-10), there are several key issues:

- For women, there is no statistically significant difference from men in mathematics course taking until the level of precalculus. In terms of participation rates, women and men are roughly equivalent in college algebra, statistics, and finite/discrete mathematics.
- Women still lean more toward the life sciences than the physical sciences, though their strong participation rates in the two chemistry courses (appendix table 3-10) indicate the border of the physical sciences is accessible.

- The mathematics course-taking patterns of black students have an effect on their participation in other science, mathematics, and engineering fields. Participation rates are high at both the precollege level and at the levels of college algebra and precalculus. The participation rate is lower in calculus and lower than it should be in finite/discrete mathematics given the proportion of black students who major in computer science (see appendix table 3-10). If advisement could help influence the 22 percent who completed precalculus and help

Figure 3-1.
Representation index of racial/ethnic/gender categories in total college enrollment: 1980–1994, selected years



Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Text table 3-1.
Representation index of racial/ethnic/gender categories in total college enrollment: 1980, 1990–1994[1]

Racial/ethnic/gender category	1980	1990	1991	1992	1993	1994
White Males	100.3	99.0	97.4	95.8	95.1	93.6
Asian Males	159.4	127.2	132.1	134.7	135.6	139.4
Black Males	66.6	56.2	57.7	58.8	60.0	60.0
Hispanic Males	63.8	48.2	51.1	54.6	57.0	59.9
American Indian Males	98.8	81.4	84.2	86.0	87.8	90.0
White Females	110.9	123.9	123.1	122.4	121.6	121.1
Asian Females	152.1	129.9	136.7	141.1	142.3	146.5
Black Females	85.4	84.4	87.7	90.3	92.3	94.5
Hispanic Females	77.6	73.0	77.0	81.4	83.6	86.4
American Indian Females	126.3	119.1	124.2	124.2	126.2	131.5

[1] Data used in the calculations of these indices are presented in appendix tables 3-6, 3-7, and 3-8.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Students With Disabilities

National data about persons with disabilities in all fields at the undergraduate level is insufficient to measure and describe the magnitude of the problems they face. For a description of undergraduate students who reported a disability, see appendix table 3-16.

The reasons that students with disabilities may not be majoring in science, mathematics, and engineering (SME) in greater numbers were examined in a recent study (Seymour and Hunter, 1998) conducted at one U.S. university. The study (see "Technical Notes to Chapter 3" for details on the study and its participants) suggests students with disabilities might be more likely to complete degrees in these fields if changes were made in faculty attitudes, financial aid requirements, and time allowed for degree completion. The study, which is described here, also showed the important role a university's disability services office can play in negotiating accommodations for students with disabilities.

Students with disabilities are significantly underrepresented in undergraduate and graduate majors in SME curricula. At first glance, one of the main causes of this is not unlike those of other underrepresented groups: the reason lies in the structure and culture of SME teaching. Students with disabilities face many unique issues and barriers in achieving success. Many students with disabilities simultaneously have a high potential for success and are at risk of dropping out or switching to another field. They must overcome significant obstacles to complete a university SME education. The three major barriers common to SME undergraduates with disabilities are faculty attitudes regarding certain accommodations, some aspects of the financial aid system, and the limitations of the disability itself.

A strong interest in their discipline, focused career aspirations, and support and accommodation in the early stages of their studies are characteristics common to successful graduates within SME. One distinguishing characteristic of those who persist from those who leave, regardless of their gender, ethnicity, or disability, is the development of particular attitudes and strategies. Students with disabilities who are most successful have communicated their needs and have identified appropriate accommodation and support. They have developed a combination of persistence, excellent organizational skills, knowledge of assistive technology, and the ability to invoke the necessary support systems or agencies when dealing with barriers.

Faculty Attitudes

None of the Seymour and Hunter (1998) study participants recommended changes in the accommodation system administered by disability services offices. They did suggest that, in many cases, faculty attitudes had negative impact on the system and needed to be addressed.

Faculty responses to formal accommodation requests from students with disabilities included the following:

- Discounting the need for accommodation
- Refusing the accommodation as a way to "prepare" the student for "real world" competition
- Encouraging students to drop the class or change majors
- Placing the students in inappropriate testing places (subject to noise or periodic interruptions)
- Forgetting to send a test or not communicating changes or errors (if student arranged testing under disability services administration)
- Lowering grades for work done under accommodated conditions
- Insisting on knowing the nature of the student's disability, treatment, or medication in order to decide whether they will agree to the accommodation already requested and/or arranged by the disability services office
- Embarrassing student by talking about the disability or accommodations in front of peers

Study participants perceived, based on faculty responses to requests for accommodations, that some SME faculty "approved" certain conditions as "genuine disabilities" and exercised various degrees of skepticism about all others. The conclusion made by many students is that the rigors of the entirely unofficial process of approving accommodations already granted by the university has little to do with academic issues. For those faculty who act in the "gatekeeper" role, it may be seen as an appropriate way of testing for fitness to belong to the academic and professional communities based on SME disciplines. The essentially moral question raised by many requests for accommodations is if in granting it a student with a disability would be given an unfair advantage over other students.

Students With Disabilities *(continued)*

Financial Aid

The main difficulties of students who sought support through the university's financial aid office were that the rules that apply to all financial aid recipients do not make allowances for carrying less than a full class load, the nature of the disability, its variability or unpredictability, the effects of particular medications, problems of fatigue, and unexpected crises of mobility and transportation. These are issues which can make a full complement of classes very difficult or impossible for many students with disabilities. Taking a full load to qualify for financial aid very commonly creates a pattern of "incompletes," failures, and temporary withdrawals.

Some students in this study believed they would have spent less time, energy, and money repeating classes had they been allowed to work at a pace commensurate with the constraints of their disability.

Attrition and the Stop-Go Phenomenon

Although the attrition rate of students with disabilities appears comparable with those of students of color, there are major differences. The "attrition" of students with disabilities is often temporary, more of a stop-go pattern to their progress rather than an abandonment of their education or their field.

Approximately one-third of the undergraduates in the study reported feeling sufficiently discouraged to consider leaving either their major or their institution. Four related issues recurred in the explanations of undergraduates with disabilities who were considering leaving or who had left: financial problems; intermittent troubles due to the disability; accumulation of "incompletes" in the record, related both to the disability and financial difficulties; and accommodation difficulties.

Most students with disabilities resumed their studies once a specific disability setback and/or their financial situation had improved, or they were able to resolve problems with their academic record. This is not, however, a pattern indicated in the SME attrition rates of students of color, women, or white males. Because time out of school was reported by the undergraduates with disabilities themselves to be, typically, one semester, the overall time taken to complete SME majors (i.e., a little over 5 years) is similar to time taken by those students without disabilities.

Disability as a "Disadvantage of Time"

Coping with time-related problems was a universal feature of the experience of all study participants. It distinguishes their circumstances from those of other SME majors, is a facet of every type of barrier they encounter, and transcends differences of students with disabilities of different types. The time issues that participants raised were of five broad types: problems of pace; speed of learning, comprehension, and recall; temporal disruptions in physical and mental functions; time-related educational needs; and time expended in coping with difficulties raised by their disabilities.

Because SME faculty usually measure academic success (as opposed to demonstrations of knowledge and comprehension in other forms) by specific standards and time-related criteria, the slower pace at which students with many types of disabilities must work becomes a critical disadvantage. Students with learning and other disabilities must find alternative ways to absorb and apply class materials. Fluctuations in a disability or the side effects of medication may prevent students from concentrating on their studies. Basic educational requirements and activities of daily living take more time. Coping with these difficulties can be frustrating and take valuable time away from studies.

Disability Services

To meet the needs of students with all types of disabilities, a university's Disability Services Office can play a significant role in helping to negotiate accommodations among students, faculty, university administration, and outside agencies. Students with disabilities identified the following Disability Services-arranged services and accommodations as having special value: preregistration, arranging priority access to particular classes, changing inaccessible or remote classrooms, getting textbooks recorded prior to the start of classes, arranging special test accommodations, and assistance in locating and trying out assistive technology.

move more of them forward into calculus, participation rates in the physical sciences might be higher.

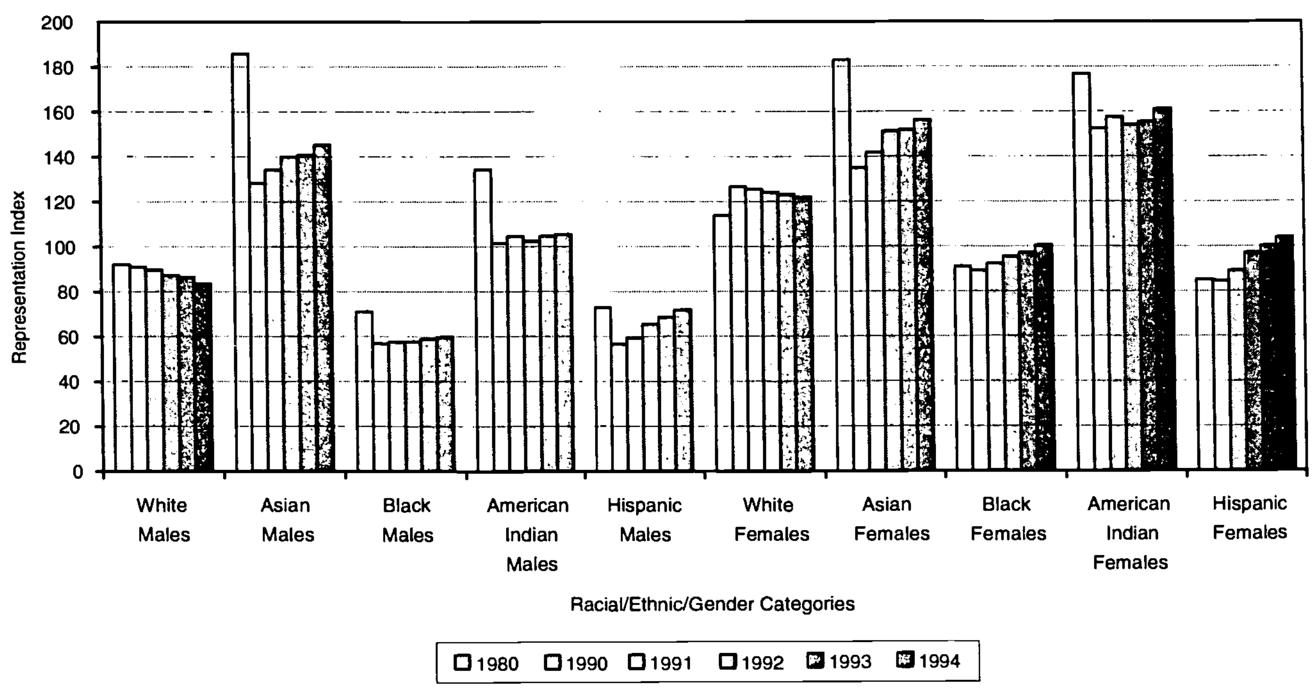
- Black students also show enrollment patterns in which physical science is more likely covered through an elective course rather than a required course. If students choose to maintain this pattern, these students will not reach intermediate-level knowledge in specific physical science disciplines.
- In general, Hispanic students have a stronger participation profile in the physical sciences than they do in the life sciences.

A similar picture of the course taking among those students taking courses primarily in 2-year institutions did not yield results rich enough for convincing analyses of the differences by race/ethnicity. There is no question that, when transfer students are excluded, however, the remaining group shows distinct gender differences in participation patterns. Appendix table 3-11 clearly shows this pattern of gender differences in technical mathematics (men) versus business mathematics (women), introductory computer science (men) versus data processing (women), and computer technology courses (men) versus the biology courses taken as part of associate's degree programs in nursing and allied health.

Although analysis of course taking by students in 2-year institutions is not feasible, detailed analyses were made of patterns of representation of racial/ethnic and gender categories among persons attending 2-year colleges. Analyses were made for the total enrollment of 2-year colleges in the United States. It is noted that racial/ethnic and gender patterns of total enrollment at 2-year colleges are similar to patterns of full-time enrollment at these institutions. (See appendix tables 3-12 and 3-13.)

The representation of white males among the 2-year college population has been proportionally decreasing since 1980. (See figure 3-2, text table 3-2, and appendix tables 3-14 and 3-15.) In fact, by 1994 only white males, black males, and Hispanic males had IR scores less than 100. The other groups are attending 2-year colleges at a higher rate than their population proportions would suggest. Since 1990, the 2-year college enrollment IR scores of Hispanic males and females, Asians males and females, and black females have been increasing dramatically. The IR scores for American Indian females, already at a high level, have increased slightly during the 1990s. The IR scores for black males have increased slightly. As of 1994, black males had the lowest proportional representation among persons attending 2-year institutions. (See appendix tables 3-12 and 3-13.)

Figure 3-2.
Representation index of racial/ethnic/gender categories in the total enrollment at 2-year institutions: 1980, 1990–1994



Text table 3-2.
Representation index of racial/ethnic/gender categories in the total enrollment at 2-year institutions: 1980, 1990–1994[1]

Racial/ethnic/gender category	1980	1990	1991	1992	1993	1994
White Males	92.2	91.0	89.7	87.3	86.4	85.0
Asian Males	185.9	128.4	134.4	140.1	140.9	145.4
Black Males	71.1	56.9	57.7	57.9	59.0	59.9
Hispanic Males	73.0	56.6	59.4	65.5	68.6	71.8
American Indian Males	134.3	101.6	104.6	102.4	104.7	105.5
White Females	113.9	126.7	125.5	124.2	123.1	121.8
Asian Females	183.1	135.0	141.8	151.3	151.8	156.1
Black Females	91.0	89.2	92.4	95.5	97.3	100.4
Hispanic Females	85.2	84.6	89.2	97.1	100.2	103.9
American Indian Females	176.7	152.5	157.6	153.9	155.6	161.1

[1] Data used in the calculations of these indices are presented in appendix tables 3-14 and 3-15.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Four-Year Institutions

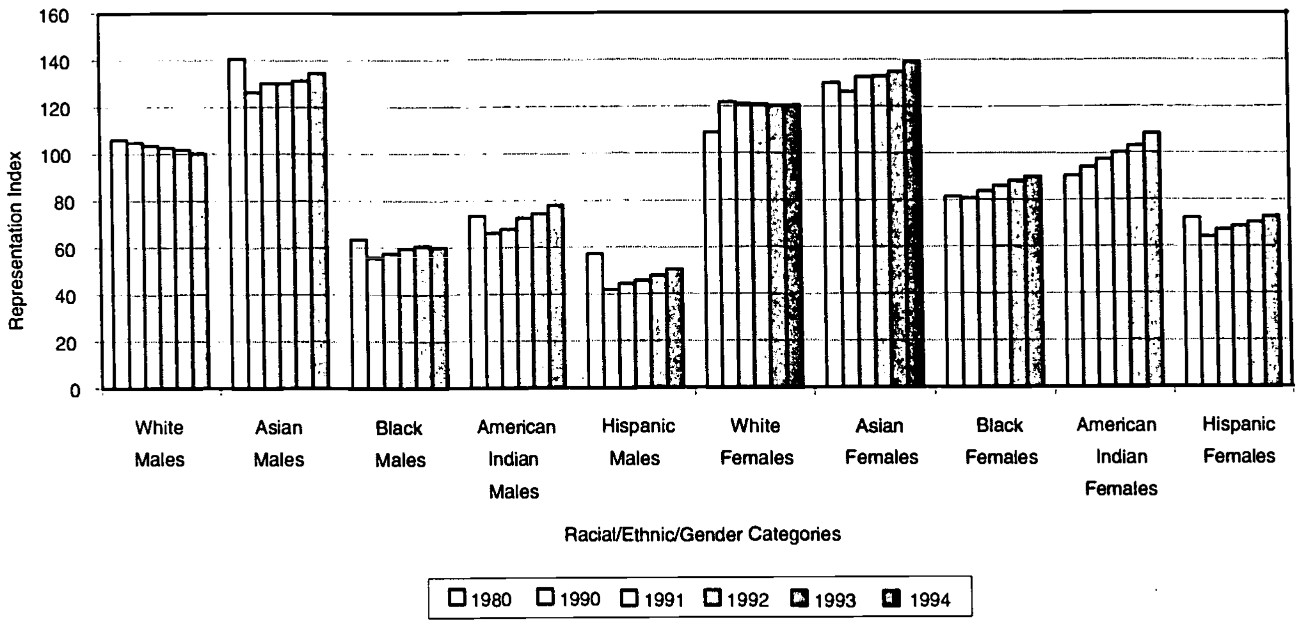
Although full-time enrollment at all undergraduate institutions has risen over the past 20 years (see appendix table 3-17), the enrollment of white men enrolled full time in 4-year institutions has declined by 10 percent from 1976 to 1994. At the same time, the enrollment of white women has remained almost constant (38 percent of total full-time enrollment at 4-year institutions). During the same period, the enrollment of all racial/ethnic minority groups has risen. The most notable increases in total full-time enrollment at all institutions during that period were for women, who increased from 46 percent to 54 percent; Hispanic students, who grew from 4 percent to 8 percent of the total full-time fall enrollment; and Asian students, who constituted 2 percent of the total full-time enrollment in fall 1976 and 6 percent in fall 1994. Racial/ethnic and gender patterns among total enrollment at 4-year institutions are similar to those for full-time enrollment at these institutions (see appendix tables 3-18 and 3-19).

The representation of the racial/ethnic and gender groups in 4-year institutions is similar to that in 2-year institutions in that there are more Asian males and females in both types of institutions than would be expected from their proportion in the population (see figure 3-3, text table 3-3, and appendix tables 3-20 and 3-21). This unexpected level was also found among American Indian females enrolled in 2-year institutions from 1980 through 1994. Although this group of American Indian females was underrepresented in 4-year institutions in 1980, since then it has increased its representation in these institutions and has achieved parity since 1992.

Additional findings from the IR analysis of particular interest are

- The representation of white males in both types of institutions has decreased since 1980, yet in 1994, white males were at parity in 4-year institutions.
- Hispanic males and females have increased their representation in 4-year institutions, although not to the same extent as they have done in 2-year institutions.
- Hispanic females achieved parity at 2-year institutions in 1993 and 1994; their IR score for enrollment in 4-year institutions was slightly less than 73 in 1994.
- The proportional representation of black males in 4-year institutions is about the same as it is in 2-year institutions, ranging from an IR score of slightly less than 56 to 60 during the 1990s. Black males have made very little progress in their enrollment patterns at both types of institutions.

Figure 3-3.
Representation index of racial/ethnic/gender categories in the total enrollment of undergraduate students at 4-year institutions: 1980, 1990–1994



Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Text table 3-3.
Representation index of racial/ethnic/gender categories in the total enrollment of undergraduate students at 4-year institutions: 1980, 1990–1994[1]

Racial/ethnic/gender category	1980	1990	1991	1992	1993	1994
White males	106.1	104.9	103.6	102.7	101.9	100.4
Asian males	140.6	126.3	130.3	130.3	131.4	134.7
Black males	63.5	55.7	57.6	59.5	60.7	60.0
Hispanic males	57.3	41.9	44.5	45.8	47.9	50.6
American Indian males	73.6	66.3	67.9	72.7	74.4	78.0
White females	108.8	121.9	121.1	120.9	120.4	120.6
Asian females	130.1	126.2	132.6	133.0	134.8	139.0
Black females	81.5	80.7	83.9	86.1	88.3	90.0
Hispanic females	72.2	64.2	67.2	68.7	70.4	72.8
American Indian females	90.4	94.0	97.3	100.3	103.0	108.4

[1] Data used in the calculations of these indices are presented in appendix tables 3-20 and 3-21.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

- Although black females achieved parity at 2-year institutions in 1994, their IR score for 4-year institutions, though increasing, achieved only 90 in 1994.

Bachelor's Degrees

The percentage of women of all racial/ethnic groups who have been awarded bachelor's degrees in science and engineering has risen dramatically over the past 30 years. (See appendix table 3-2.)[3] In 1966, women received 25 percent of all science and engineering bachelor's degrees awarded and 52 percent of degrees in non–science-and-engineering fields. By 1995, women received almost half (47 percent) of all science and engineering bachelor's degrees awarded and 58.7 percent of all non–science-and-engineering bachelor's degrees awarded. During the decade of the 1980s, the total number of bachelor's degrees awarded to all groups, especially women, increased. In the 10-year period between 1984 and 1994, the number of bachelor's degrees awarded to men increased by 10 percent, whereas those awarded to women rose by 29 percent. (See appendix tables 3-2 and 3-3.)

For both 1994 and 1995, approximately 40 percent of the bachelor's degrees earned by white males, American Indian males, and Hispanic males were in science and engineering. Fifty-seven percent of the bachelor's degrees earned by Asian males and 36 percent of the degrees earned by black males were in science and engineering. (See text tables 3-4 and 3-5 and appendix table 3-4.)

In 1994 and 1995, 40 percent of the bachelor's degrees earned by Asian females were in science and engineering. The percentage of degrees in science and engineering among the other female categories range from 27 to 30 percent for both years; black females had a higher percentage than the other female racial/ethnic categories. (See appendix table 3-5.)

White males continue to earn more than 60 percent of the bachelor's degrees awarded in engineering. White women had the next highest percentage—12 percent—of the engineering bachelor's degrees awarded in 1994 and 1995. Nine percent of these degrees were earned by Asian males. For both years, the percentage of the engineering degrees earned by Hispanic males was slightly higher than the percentage of these degrees earned by black males. Less than 1 percent of these degrees were earned by American Indians.

[3] Nonresident aliens and persons whose race/ethnicity are unknown are excluded from these tables.

Differences among racial/ethnic and gender categories by field are considerable.

Physical, Computer, and Agricultural Sciences

- Fifty-four to 58 percent of the bachelor's degrees in these fields were earned by white males.
- White females earned 35 percent of the bachelor's degrees in agricultural science. They earned 27 percent of the bachelor's degrees in the physical sciences and 17 percent of the bachelor's degrees in computer science.
- Asian males earned 4 percent of the bachelor's degrees in the physical sciences and 7 percent of the degrees in computer science.
- Black males, Asian females, and black females each earned 3 percent of the bachelor's degrees in the physical sciences and 4 to 6 percent of the bachelor's degrees in computer science. Less than 1 percent of the bachelor's degrees in these areas were earned by American Indians.

Mathematics

There is a small difference between white males and females in their percentage of the total number of bachelor's degrees earned in mathematics.

- White males earned 44 percent of the bachelor's degrees in mathematics in 1994 and 42 percent in 1995.
- White females earned 38 percent of the bachelor's degrees in mathematics in both years.
- Asians and blacks, both males and females, earned essentially the same percentage of the degrees in mathematics (4 percent) in 1995. In 1994, Asian females and black males earned 3 percent.
- Two percent of the bachelor's degrees in mathematics were earned by Hispanics.
- Less than 1 percent were earned by American Indians.

Social Sciences

Differences between white males and females in social sciences are similar to those found in mathematics.

Text table 3-4.
Distribution of earned bachelor's degrees, by field, race, ethnicity, and gender: 1995

Field of degree	Total	White males	Asian males	Black males	Hispanic males	American Indian males	White females	Asian females	Black females	Hispanic females	American Indian females
Total	1,110,512	407,155	28,348	30,998	27,875	2,669	485,630	30,947	54,289	38,816	3,785
Engineering	57,228	36,785	5,340	1,846	2,895	176	6,941	1,445	999	756	45
Physical science	18,231	10,006	784	495	437	66	4,946	563	539	363	32
Mathematical science	12,897	5,456	519	476	315	29	4,887	446	519	221	29
Computer science	21,812	11,793	1,583	1,241	876	73	3,739	782	1,257	431	37
Biological science	54,277	19,790	3,467	981	1,340	128	20,838	3,576	2,250	1,750	157
Agricultural science	14,180	8,152	130	121	228	82	4,968	157	142	158	42
Social science	127,184	54,508	3,247	4,565	3,774	403	46,050	3,758	6,356	4,103	420
Psychology	69,936	15,241	969	1,402	1,166	120	40,673	2,362	4,339	3,377	287
Non-science and engineering	734,767	245,424	12,309	19,871	16,844	1,592	352,588	17,858	37,888	27,657	2,736
Percentage distributions within race/ethnic/gender categories:											
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Engineering	5.2%	9.0%	18.8%	6.0%	10.4%	6.6%	1.4%	4.7%	1.8%	1.9%	1.2%
Physical science	1.6%	2.5%	2.8%	1.6%	1.6%	2.5%	1.0%	1.8%	1.0%	0.9%	0.8%
Mathematical science	1.2%	1.3%	1.8%	1.5%	1.1%	1.1%	1.0%	1.4%	1.0%	0.6%	0.8%
Computer science	2.0%	2.9%	5.6%	4.0%	3.1%	2.7%	0.8%	2.5%	2.3%	1.1%	1.0%
Biological science	4.9%	4.9%	12.2%	3.2%	4.8%	4.8%	4.3%	11.6%	4.1%	4.5%	4.1%
Agricultural science	1.3%	2.0%	0.5%	0.4%	0.8%	3.1%	1.0%	0.5%	0.3%	0.4%	1.1%
Social science	11.5%	13.4%	11.5%	14.7%	13.5%	15.1%	9.5%	12.1%	11.7%	10.6%	11.1%
Psychology	6.3%	3.7%	3.4%	4.5%	4.2%	4.5%	8.4%	7.6%	8.0%	8.7%	7.6%
Non-science and engineering	66.2%	60.3%	43.4%	64.1%	60.4%	59.6%	72.6%	57.7%	69.8%	71.3%	72.3%
Percentage distributions within field of degree categories:											
Total	100.0%	36.7%	2.6%	2.8%	2.5%	0.2%	43.7%	2.8%	4.9%	3.5%	0.3%
Engineering	100.0%	64.3%	9.3%	3.2%	5.1%	0.3%	12.1%	2.5%	1.7%	1.3%	0.1%
Physical science	100.0%	54.9%	4.3%	2.7%	2.4%	0.4%	27.1%	3.1%	3.0%	2.0%	0.2%
Mathematical science	100.0%	42.3%	4.0%	3.7%	2.4%	0.2%	37.9%	3.5%	4.0%	1.7%	0.2%
Computer science	100.0%	54.1%	7.3%	5.7%	4.0%	0.3%	17.1%	3.6%	5.8%	2.0%	0.2%
Biological science	100.0%	36.5%	6.4%	1.8%	2.5%	0.2%	38.4%	6.6%	4.1%	3.2%	0.3%
Agricultural science	100.0%	57.5%	0.9%	0.9%	1.6%	0.6%	35.0%	1.1%	1.0%	1.1%	0.3%
Social science	100.0%	42.9%	2.6%	3.6%	3.0%	0.3%	36.2%	3.0%	5.0%	3.2%	0.3%
Psychology	100.0%	21.8%	1.4%	2.0%	1.7%	0.2%	58.2%	3.4%	6.2%	4.8%	0.4%
Non-science and engineering	100.0%	33.4%	1.7%	2.7%	2.3%	0.2%	48.0%	2.4%	5.2%	3.8%	0.4%

NOTE: These data exclude nonresident aliens and U.S. citizens and permanent residents for whom their race/ethnicity was unknown.
SOURCE: National Science Foundation, Science and Engineering Degrees, by Race/Ethnicity of Recipients, 1987–1994, (NSF 96-329) (Arlington, VA, 1996).

Text table 3-5.
Distribution of earned bachelor's degrees, by field, race, ethnicity, and gender: 1994

Field of degree	Total	White males	Asian males	Black males	Hispanic males	American Indian males	White females	Asian females	Black females	Hispanic females	American Indian females
Total	1,123,862	420,211	26,420	30,106	25,860	2,562	497,913	28,255	52,210	36,823	3,502
Engineering	57,223	37,830	5,235	1,784	2,495	179	6,857	1,281	875	648	39
Physical science	17,449	9,958	648	464	415	52	4,658	448	457	318	31
Mathematical science	13,609	5,920	523	457	300	29	5,169	403	535	243	30
Computer science	21,674	12,022	1,476	1,161	719	59	3,794	771	1,237	416	19
Biological science	50,028	18,882	2,992	927	1,298	112	19,060	2,967	2,053	1,603	134
Agricultural science	12,619	7,333	82	137	193	66	4,400	91	131	143	43
Social science	132,989	58,409	3,204	4,644	3,774	395	48,454	3,522	6,191	3,974	422
Psychology	67,267	14,891	807	1,232	996	113	39,979	1,970	4,004	2,994	281
Non-science and engineering	751,004	254,966	11,453	19,300	15,670	1,557	365,542	16,802	36,727	26,484	2,503
Percentage distributions within race/ethnic/gender categories:											
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Engineering	5.1%	9.0%	19.8%	5.9%	9.6%	7.0%	1.4%	4.5%	1.7%	1.8%	1.1%
Physical scienc	1.6%	2.4%	2.5%	1.5%	1.6%	2.0%	0.9%	1.6%	0.9%	0.9%	0.9%
Mathematical science	1.2%	1.4%	2.0%	1.5%	1.2%	1.1%	1.0%	1.4%	1.0%	0.7%	0.9%
Computer science	1.9%	2.9%	5.6%	3.9%	2.8%	2.3%	0.8%	2.7%	2.4%	1.1%	0.5%
Biological science	4.5%	4.5%	11.3%	3.1%	5.0%	4.4%	3.8%	10.5%	3.9%	4.4%	3.8%
Agricultural science	1.1%	1.7%	0.3%	0.5%	0.7%	2.6%	0.9%	0.3%	0.3%	0.4%	1.2%
Social science	11.8%	13.9%	12.1%	15.4%	14.6%	15.4%	9.7%	12.5%	11.9%	10.8%	12.1%
Psychology	6.0%	3.5%	3.1%	4.1%	3.9%	4.4%	8.0%	7.0%	7.7%	8.1%	8.0%
Non-science and engineering	66.8%	60.7%	43.3%	64.1%	60.6%	60.8%	73.4%	59.5%	70.3%	71.9%	71.5%
Percentage distributions within field of degree categories:											
Total	100.0%	37.4%	2.4%	2.7%	2.3%	0.2%	44.3%	2.5%	4.6%	3.3%	0.3%
Engineering	100.0%	66.1%	9.1%	3.1%	4.4%	0.3%	12.0%	2.2%	1.5%	1.1%	0.1%
Physical science	100.0%	57.1%	3.7%	2.7%	2.4%	0.3%	26.7%	2.6%	2.6%	1.8%	0.2%
Mathematical science	100.0%	43.5%	3.8%	3.4%	2.2%	0.2%	38.0%	3.0%	3.9%	1.8%	0.2%
Computer science	100.0%	55.5%	6.8%	5.4%	3.3%	0.3%	17.5%	3.6%	5.7%	1.9%	0.1%
Biological science	100.0%	37.7%	6.0%	1.9%	2.6%	0.2%	38.1%	5.9%	4.1%	3.2%	0.3%
Agricultural science	100.0%	58.1%	0.6%	1.1%	1.5%	0.5%	34.9%	0.7%	1.0%	1.1%	0.3%
Social science	100.0%	43.9%	2.4%	3.5%	2.8%	0.3%	36.4%	2.6%	4.7%	3.0%	0.3%
Psychology	100.0%	22.1%	1.2%	1.8%	1.5%	0.2%	59.4%	2.9%	6.0%	4.5%	0.4%
Non-science and engineering	100.0%	34.0%	1.5%	2.6%	2.1%	0.2%	48.7%	2.2%	4.9%	3.5%	0.3%

NOTE: These data exclude nonresident aliens and U.S. citizens and permanent residents for whom their race/ethnicity was unknown.
SOURCE: National Science Foundation, Science and Engineering Degrees, by Race/Ethnicity of Recipients, 1987–1994, NSF 96-329 (Arlington, VA, 1996).

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

70 71

- White males earned 44 percent of the bachelor's degrees in social sciences earned in 1994 and 43 percent in 1995.
- Five percent of the bachelor's degrees in social sciences went to black females.
- Asian males and females and black males each earned around 2 percent of the bachelor's degrees in social sciences during these 2 years.
- Three percent of the bachelor's degrees in social sciences were earned by Hispanics.
- Less than 1 percent of degrees in social sciences were earned by American Indians.

Psychology

- For both 1994 and 1995, almost 60 percent of the bachelor's degrees earned in psychology were earned by white females.
- White males earned 22 percent of these degrees.
- Six percent of the degrees were earned by black females, and 3 percent were earned by Asian females. Females in Hispanic and American Indian categories earned less than 2 percent of the degrees in psychology in 1994 and 1995.

Indices of Representation

Indices of Representation were computed to assess the relative representation of racial/ethnic and gender groups in the awarding of bachelor's degrees. (See text tables 3-6 and 3-7 and appendix tables 3-22, 3-23, and 3-24.) In 1994, considering all fields, three of the ten racial/ethnic and gender categories had an IR score of 100 or greater: white males and females and Asian females. (See text tables 3-6 and 3-7 and appendix table 3-22.) Asian males had an IR score slightly less than 100, and American Indian females had an IR score of slightly more than 90. The scores for 1995 are not substantially different from the scores for 1994. Black males had the lowest IR scores for both 1994 and 1995.

The racial/ethnic and gender groups differ a great deal when their IR scores within fields of study are compared.

Engineering

- Asian males are highly overrepresented in engineering, indicating that for 1994 and 1995 their proportion among persons earning bachelor's degrees in engineering was well over three times their proportion among full-time, first-time, first-year college students.
- All of the male racial/ethnic categories, except black males, have IR scores in engineering higher than 100 for these 2 years. Asian females have IR scores just below 100 for the 2 years.
- In 1994 and 1995, except for Asian females, females in each racial/ethnic category had IR scores for bachelor's degrees in engineering of less than 32.

Physical Sciences and Mathematics

- For both 1994 and 1995, the IR scores of Asians (both males and females), American Indian males, and white males are higher than 100 for bachelor's degrees in the physical sciences and mathematical sciences.
- White females are not far away from parity in earning bachelor's degrees in mathematical sciences.

Computer Sciences

- In 1994 and 1995, Asian males had the highest IR score for bachelor's degrees in the computer sciences. They are followed by Asian females and white males.
- The proportion of degrees in computer sciences earned by black males and Hispanic males in 1994 and 1995 was higher than their proportion among full-time, first-time, first-year students in 1990.
- In 1995, all the male racial/ethnic categories had an IR over 100 for degrees in the computer sciences.
- Black females had an IR score below parity for both years, but those scores were much higher than those of Hispanic females, white females, and American Indian females.

Biological Sciences

- Asian males and females earned bachelor's degrees in 1994 and 1995 in the biological sciences at a rate that was over two times their proportion among full-time, first-time, first-year students in 1990 and 1991.
- The proportion of white males among those earning bachelor's degrees in 1994 and 1995 in the biological sciences was slightly higher than their proportion among full-time, first-time, first-year students in 1990 and 1991, respectively.

Text table 3-6.

Representation index of racial/ethnic/gender categories in earned bachelor's degrees by field: 1994 [1]

Race/ethnicity/gender	All fields	Engineering	Physical sciences	Mathematical sciences	Computer sciences	Biological sciences	Agricultural sciences	Social sciences	Psychology	Non-science and engineering
White, non-Hispanic males	101.5	179.4	154.9	118.1	150.5	102.4	157.7	119.2	60.1	92.1
Asian or Pacific Islander males	98.9	384.8	156.2	161.6	286.4	251.5	27.3	101.3	50.5	64.1
Black, non-Hispanic males	57.9	67.4	57.4	72.5	115.7	40.0	23.5	75.4	39.6	55.5
Hispanic males	76.2	144.5	78.8	73.0	109.9	86.0	50.7	94.0	49.1	69.1
American Indian or Alaskan Native males	79.0	108.4	103.2	73.8	94.3	77.5	181.2	102.9	58.2	71.8
White, non-Hispanic females	110.9	30.0	66.8	95.1	43.8	95.4	87.3	91.2	148.8	121.8
Asian or Pacific Islander females	105.9	94.3	108.2	124.8	149.9	249.9	30.4	111.6	123.4	94.3
Black, non-Hispanic females	72.1	23.7	40.6	61.0	88.5	63.7	16.1	72.2	92.3	75.9
Hispanic females	87.7	30.3	48.8	47.8	51.4	85.8	30.3	80.0	119.1	94.4
American Indian or Alaskan Native females	93.2	20.4	53.1	65.9	26.2	80.1	101.9	94.9	124.9	99.7

[1] Data used in the calculations of these indices are presented in appendix table 3-22.

NOTE: These data exclude nonresident aliens and U.S. citizens and permanent residents for whom their race/ethnicity was unknown.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

73 74

BEST COPY AVAILABLE

Text table 3-7.

Representation index of racial/ethnic/gender categories in earned bachelor's degrees by field: 1995[1]

Race/ethnicity/gender	All fields	Engineering	Physical sciences	Mathe-matical sciences	Computer sciences	Biological sciences	Agricultural sciences	Social sciences	Psychology	Non-science and engineering
White, non-Hispanic males	102.0	178.9	152.8	117.7	150.5	101.5	160.0	119.3	60.7	93.0
Asian or Pacific Islander males	102.0	372.9	171.9	160.8	290.0	255.3	36.6	102.0	55.4	66.9
Black, non-Hispanic males	57.4	66.3	55.8	75.8	116.9	37.1	17.5	73.8	41.2	55.6
Hispanic males	75.7	152.6	72.3	73.7	121.1	74.5	48.5	89.5	50.3	69.1
American Indian or Alaskan Native males	82.2	105.2	123.8	76.9	114.4	80.6	197.7	108.3	58.7	74.1
White, non-Hispanic females	111.2	30.8	69.0	96.4	43.6	97.6	89.1	92.1	147.9	122.0
Asian or Pacific Islander females	105.8	95.9	117.3	131.3	136.1	250.2	42.0	112.2	128.2	92.3
Black, non-Hispanic females	73.6	26.3	44.5	60.6	86.7	62.4	15.1	75.2	93.4	77.6
Hispanic females	84.5	31.9	48.1	41.4	47.8	78.0	26.9	78.0	116.8	91.0
American Indian or Alaskan Native females	94.7	21.8	48.8	62.5	47.1	80.4	82.3	91.8	114.0	103.5

[1] Data used in the calculations of these indices are presented in appendix table 3-23.

NOTE: These data exclude nonresident aliens and U.S. citizens and permanent residents for whom their race/ethnicity was unknown.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

- The IR score of white females for 1994 and 1995 indicated that they were just below parity in degrees earned in the biological sciences.

Agricultural Sciences

- American Indian males have the highest IR score among the racial/ethnic and gender groups for earning bachelor's degrees in agricultural sciences in 1994 and 1995.
- White males had an IR score well above parity for these 2 years.
- With the exception of white females and American Indian females, the IR scores of the other racial/ethnic and gender groups were low for both 1994 and 1995.

Social Sciences

- White males, Asian males and females, and American Indian males had IR scores above 100 for degrees in social sciences in 1994 and 1995.
- The IR scores for the other racial/ethnic and gender categories for degrees in social sciences ranged between 72 and 95 for these 2 years.
- Not one racial/ethnic and gender category has an extremely low IR score for degrees in social sciences.

Psychology

- For 1994 and 1995, not one male racial/ethnic category has an IR score higher than 61.
- Except for black females, every female category has an IR score for psychology that is higher than 100 for both 1994 and 1995.
- Black females had an IR score in the 90s for these 2 years.

Non–Science-and-Engineering

- White females had an IR score around 122 for degrees in non–science-and-engineering fields in both 1994 and 1995.
- American Indian females had a score essentially at parity in 1994 and slightly more than parity in 1995 for degrees in non–science-and-engineering areas.
- White males and Asian females had an IR score in the lower 90s in both 1994 and 1995 for degrees in non–science-and-engineering areas.
- The IR scores for the other three racial/ethnic and gender categories ranged from slightly less than 56 to slightly less than 78.

Mathematics and Science Experiences of Young Women

Young women in the United States continue to be more likely than young men to stop taking courses, earn lower grades, and lose interest in mathematics and science during the high school years. As early as 7th grade, girls are less likely than boys to aspire to mathematics and science jobs or to believe science knowledge is needed for a good job.

When the mathematics and science experiences of women in race and class subgroups are examined, class affects these experiences in an expected manner. For example, women from upper SES (socioeconomic status) families are over three times as likely as those from lower SES families to have scored in the upper quartile on mathematics and science achievement indicators at some time during their high school years. Race, however, does not always work in the expected way. In fact, equally qualified black women are more likely to have positive mathematics and science achievement and to be taking mathematics and science courses than are their white counterparts. Analyses of these young black women's resources suggests that their advantage may come from mothers who have high expectations and are very involved in their daughters' lives.

An understanding of gender and science requires a longitudinal look at experiences in multiple areas of mathematics and science. Ebbs and flows in science interest and aptitude are common. Most women do not permanently leave the science pipeline until the post–high-school years.

— Sandra L. Hanson, Associate Professor of Sociology, Catholic University, Adapted from *Lost Talent: Women in the Sciences*

The Engineering Path[4]

Research conducted by the U.S. Department of Education examines the routes students take to earn an undergraduate degree in engineering.[5] In its most elaborate configuration, this route, or engineering path (EPATH) sets forth 11 "stations beyond the threshold" for bachelor's degree candidates. Each station describes student history (for example, "Mediocre Performance, Leaves Engineering for a different science, mathematics, engineering, or technology (SMET) field" or "Completes Bachelor's in Engineering, Architecture, or Engineering Technology and Continues to Graduate School in a non-SMET field").

Text table 3-8 aggregates these heuristics for academic career histories into three stations and compares men and women. The story told by these and allied data is complex. On the one hand, the academic background of women, particularly in mathematics, was stronger than for men. At the same time, however, their degree completion rate in engineering

[4] The data used in this analysis come from a national age-cohort longitudinal study and rely heavily on the college transcripts of participants in that study. That study, conducted over 13 years by the National Center for Education Statistics, followed the high school graduating class of 1982, known as the High School and Beyond Sophomore Cohort (HS&B/So). The college transcripts were gathered in 1993, when the members of this cohort were 29 to 30 years old.

[5] Engineering path (EPATH) is an empirically derived model for describing what happens to all students who cross a curricular threshold that would qualify them to pursue degrees in engineering, architecture, or engineering technologies. For a full explication, see Adelman, C., *Women and Men of the Engineering Path: A Model for Analysis of Undergraduate Careers*. Washington, DC: U.S. Department of Education and the National Institute for Science Education, 1998.

Text table 3-8.
Students who reached at least the threshold of the engineering curriculum in 4-year colleges, by gender, progress in engineering, and selected high school background characteristics: 1982–1993 cohort

Gender	Progress in Engineering		
	Completed only threshold courses in engineering	Took engineering courses beyond threshold but left engineering	Completed bachelor's in engineering, architecture, or engineering technologies
Academic career history (row percentages)[1]			
Men	18.3	20.0	61.6
Women	22.7	35.4	41.9
Percent who had planned to major in engineering when in high school:			
Men	64.22	60.52	72.8
Women	59.82	56.02	53.8
Percent who had completed calculus in high school:			
Men	20.2	21.22	25.7
Women	60.4	Low N [2]	36.3

[1] Because of rounding, rows may not add to 100 percent.
[2] Male/female comparisons are not statistically significant.

NOTES: Universe: All students who reached at least the threshold of the engineering curriculum in 4-year colleges. Weighted N = 149,841. Degree completion covers engineering, architecture, and engineering technologies.

SOURCE: NCES, High School and Beyond/Sophomore Cohort, 1982–1993 Cohort

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

The Engineering Path *(continued)*

was significantly lower, even though the grade-point averages (GPAs) of female degree-completers were almost identical to those of men (men: 2.88, standard deviation = .561; women: 2.98, standard deviation = .437). Among degree completers, a far lower percentage of women had planned to major in engineering when they were seniors in high school, suggesting that some programs have been successful in changing women's attitudes toward the field.

Over a third (35.4 percent) of the women who reached the curricular threshold continued, but then changed fields. Compared to men who left the engineering path, this group had slightly weaker mathematics backgrounds and slightly lower GPAs (2.71 to 2.83), but a much higher proportion of bachelor's degree completers (80 percent for women versus 60 percent for men). Where did they go? The physical sciences (not the life sciences) and computer science took most (44 percent) of the women who left engineering and completed bachelor's degrees in other fields. (See text table 3-9.) These choices may reflect prior academic investments in mathematics and interest in more theoretical SMET fields.

Text table 3-9.
Major fields of those who left engineering but completed bachelor's degrees: 1982–1993 cohort, by gender [percentage distribution]

Major field	Men	Women	All
Computer science	31.4	14.3	27.1
Business (including accounting, finance, marketing, etc.)	25.4	14.9	22.7
Physical sciences	17.3	29.5	20.4
Social sciences	11.41	Low N[1]	10.91
Life sciences	Low N[1]	15.11	6.2
All other	11.31	17.01	12.7

[1] Male/female comparisons are not statistically significant.

SOURCE: NCES, High School and Beyond/Sophomore Cohort, 1982–1993 Cohort

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

—Clifford Adelman, Senior Research Analyst, U.S. Department of Education

Changes in Course Participation, 1972–1993

College transcripts from two longitudinal studies sponsored by the U.S. Department of Education's National Center for Education Statistics provide the basis for generating time-series data on college course taking.[6] The analysis focuses on students who primarily attend 4-year institutions. Text table 3-10 displays the changes in the proportion of students in each cohort who completed courses in four key categories of mathematics. (There are 20 course categories in the mathematics taxonomy used in these studies.) With few exceptions, participation rates increased for all subgroups in all four of the categories. A principal reason for this expansion may lie in a jump in the proportion of bachelor's degree recipients majoring in business fields from 17 percent to 25 percent; simultaneously, the mathematics requirements for business degrees increased.

[6] The first of these cohorts was the high school graduating class of 1972 (NLS-72); the second was the high school graduating class of 1982 (High School and Beyond/Sophomore Cohort). The college records of these two cohorts, gathered at approximately age 30 in both cases, cover the period from 1972 to 1993. There are some striking differences in the undergraduate course participation rates of students in these two cohorts.

Nonetheless, with respect to participation, the following conclusions can be reached:

- Women reached virtual "participation parity" with men in college algebra and statistics taught in mathematics departments.
- The ratio of men to women completers of calculus courses dropped from 2.43:1 to 1.75:1. There is another category of calculus course not included in this table, "Calculus for Life Sciences, Economics, or Business," in which women reached near participation parity with men (for the High School and Beyond/Sophomore Cohort, 4.3 percent of women completed this "applied calculus" course compared to 4.8 percent of men).
- Among underrepresented racial/ethnic groups, Hispanic students evidence the most dramatic increase in participation in calculus; black students have the lowest participation rate.

Changes in Course Participation, 1972–1993 *(continued)*

Text table 3-11 shows the proportion of students reaching midlevel course work in key laboratory sciences. The midlevel courses were chosen to illustrate the extent to which students from different groups persist beyond introductory courses. Because the courses are midlevel, the percentage of students taking them will be comparatively small. Where there are major changes in these percentages, for example in genetics or organic chemistry, it must be determined whether these changes are caused by changes in fields of concentration. Partly for this reason, the courses selected are generally less dependent on a student's major than others. Such courses as microbiology, anatomy and physiology, or organic biochemistry (all of which are part of the Nursing curriculum) were not selected for this analysis because they distort the issue of women's participation in science beyond the introductory level. Nursing and allied sciences, like engineering, are still gender-segmented fields.[7]

There were considerable declines in participation rates in both basic and midlevel laboratory science courses from 1972 to 1982, a trend in the opposite direction of that in mathematics. In text table 3-11, these declines are noticeable in both genetics and organic chemistry, particularly among men. Only among Asian students did participation rates not decline.

[7] Of the courses selected, organic chemistry is somewhat of an outlier because it is a de facto "service course" for premeds, regardless of major. The same cannot be said for genetics, physiological psychology, or biochemistry.

Text table 3-10.
Percent of 4-year college students who completed key mathematics courses, in two age cohorts

Course, gender, and race/ethnicity	1972–1984 Cohort	1982–1993 Cohort
College algebra		
Men	19.8	26.7
Women	12.9	24.9
White	16.8	26.1
Asian	Small sample[1]	16.5
Black	17.1	26.1
Hispanic	18.3	21.5
Precalculus		
Men	22.3	26.5
Women	11.6	17.9
White	17.8	21.7
Asian	32.3	48.7
Black	12.1	22.1
Hispanic	12.4	15.5
Statistics[2]		
Men	22.7	27.4
Women	17.1	24.7
White	20.4	26.9
Asian	34.1	28.5
Black	17.0	20.5
Hispanic	16.1	20.9
Calculus		
Men	34.5	40.3
Women	14.2	23.0
White	25.9	32.2
Asian	49.1	63.3
Black	14.5	18.5
Hispanic	16.1	26.3

[1] Sample size insufficient to produce a reliable estimate.
[2] Statistics courses include only those offered in mathematics departments.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Text table 3-11.
Percent of 4-year college students who completed selected midlevel laboratory science courses, in two age cohorts

Course, gender, and race/ethnicity	1972–1984 Cohort	1982–1993 Cohort
Biochemistry		
Men	6.5	4.4
Women	5.6	5.5
White	6.2	4.8
Asian	10.2	15.9
Black	4.2	3.8
Hispanic	Small sample[1]	4.5
Genetics		
Men	10.7	6.2
Women	7.8	5.8
White	9.3	6.1
Asian	12.9	12.9
Black	7.9	3.8
Hispanic	7.3	Small sample[1]
Organic chemistry		
Men	16.1	9.6
Women	10.6	9.6
White	13.5	9.5
Asian	22.5	24.8
Black	10.2	7.3
Hispanic	11.5	5.6
Physiological psychology		
Men	2.7	3.2
Women	3.9	4.2
White	3.4	3.7
Asian	8.7	8.9
Black	Small sample[1]	2.2
Hispanic	Small sample[1]	5.8

[1] Sample size insufficient to produce a reliable estimate.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Baccalaureate Origins of Black Women Earning Doctorates

Historically Black Colleges and Universities (HBCUs) play a critical role in educating black women who go on to earn doctorates in science and engineering. A study examining the baccalaureate origins of 1,465 black women who went on to earn doctoral degrees between 1975 and 1992 in the fields of biological sciences, physical sciences, and the social sciences noted that, in 1992, black women earned 49 percent of the science and engineering (S&E) doctorates awarded to black U.S. citizens (Leggon and Pearson, 1997). Of these, the greatest number earned was in the social sciences (1,217), followed by the biological sciences (211), and the physical sciences (37).

Across fields, 52 percent earned their undergraduate degrees from predominantly white colleges and universities (PWCUs), 38 percent from HBCUs, and 10 percent from women's colleges, but there were significant differences by field.

Among black women earning doctorates in the biological sciences, almost 75 percent earned undergraduate degrees from HBCUs. Of the remaining 25 percent, half received bachelor's degrees from PWCUs and half from women's colleges. A similar pattern holds for black women earning doctorates in the physical sciences. Slightly more than two-thirds had baccalaureate origins in HBCUs. Equal proportions of the remaining one-third had such origins in women's colleges and PWCUs.

For those in the social sciences, almost 60 percent earned the baccalaureate from PWCUs; approximately 30 percent from HBCUs; and less than 10 percent from women's colleges. Of the 27 biological scientists earning undergraduate degrees in women's colleges, 18, or two-thirds, earned them from the two historically black women's colleges—Spelman and Bennett. Of the six African American women earning a doctorate in the physical sciences between 1975 and 1992, four did so from Spelman College. Among the 115 African American women earning social science doctorates, Spelman and Bennett produced more than all of the Seven Sisters colleges—54 and 51, respectively.[8]

Across fields, Spelman and Bennett Colleges produced slightly more than half of the black women earning doctorates, the Seven Sisters produced approximately two-fifths, and other women's colleges produced one-tenth.

— Cheryl B. Leggon, Wake Forest University

The continuing importance of HBCUs to the undergraduate science and engineering education of black men and women, whether or not they go on to earn doctorates, can be seen in text tables 3-12 to 3-14.

[8] The "Seven Sisters" colleges are Barnard, Bryn Mawr, Mount Holyoke, Radcliffe, Smith, Wellesley, and Vassar (now coed).

Text table 3-12.
Percentage of all science and engineering bachelor's degrees awarded to blacks by HBCUs, by field, selected years: 1987–1994

Year	Engineering	Physical sciences	Mathematics	Computer sciences	Biological sciences	Agricultural sciences	Psychology	Social sciences
1987	24.1	42.0	51.0	42.1	37.8	49.7	19.0	22.9
1991	26.4	47.5	45.5	37.5	37.5	59.3	22.8	22.9
1994	25.9	45.7	45.3	37.7	40.2	50.0	25.0	24.9

NOTE: Physical sciences includes earth and atmospheric sciences.

SOURCES: Tabulations by National Science Foundation/SRS; data from National Center for Education Statistics and IPEDS Completions Surveys, 1987–1994. See appendix tables 3-25, 3-26, and 3-27.

Baccalaureate Origins of Black Women Earning Doctorates (continued)

Text table 3-13.
Percentage of bachelor's degrees awarded to black men by HBCUs, by field, selected years: 1987–1994

Year	Engineering	Physical sciences	Mathematics	Computer sciences	Biological sciences	Agricultural sciences	Psychology	Social sciences
1987	23.1	36.0	53.4	39.1	36.5	58.0	16.9	24.7
1991	24.2	41.7	43.2	34.3	33.2	60.0	20.6	20.3
1994	23.8	42.5	39.6	32.8	36.0	50.4	23.8	22.8

NOTE: Physical sciences includes earth and atmospheric sciences.

SOURCES: Tabulations by National Science Foundation/SRS; data from National Center for Education Statistics and IPEDS Completions Surveys, 1987–1994. See appendix tables 3-25, 3-26, and 3-27.

Text table 3-14.
Percentage of bachelor's degrees awarded to black women by HBCUs, by field, selected years: 1987–1994

Year	Engineering	Physical sciences	Mathematics	Computer sciences	Biological sciences	Agricultural sciences	Psychology	Social sciences
1987	26.2	48.7	48.7	44.6	38.6	35.1	19.7	24.4
1991	30.9	53.9	47.6	40.4	39.6	58.1	23.5	24.9
1994	30.3	49.0	50.1	42.3	42.0	49.6	25.3	26.5

NOTE: Physical sciences includes earth and atmospheric sciences.

SOURCES: Tabulations by National Science Foundation/SRS; data from National Center for Education Statistics and IPEDS Completions Surveys, 1987–1994. See appendix tables 3-25, 3-26, and 3-27.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Degree Recipients in Science and Engineering From Universities in Puerto Rico

Since 1991, the number of bachelor's, master's, and doctoral degrees in science and engineering (S&E) fields conferred by institutions in Puerto Rico has increased. In 1995, institutions in Puerto Rico accounted for a significant proportion of Hispanics in the United States earning S&E degrees—16 percent of bachelor's, 11 percent of master's, and 6 percent of doctoral degrees (see figure 3-4 and appendix tables 3-28, 3-29, and 3-30).

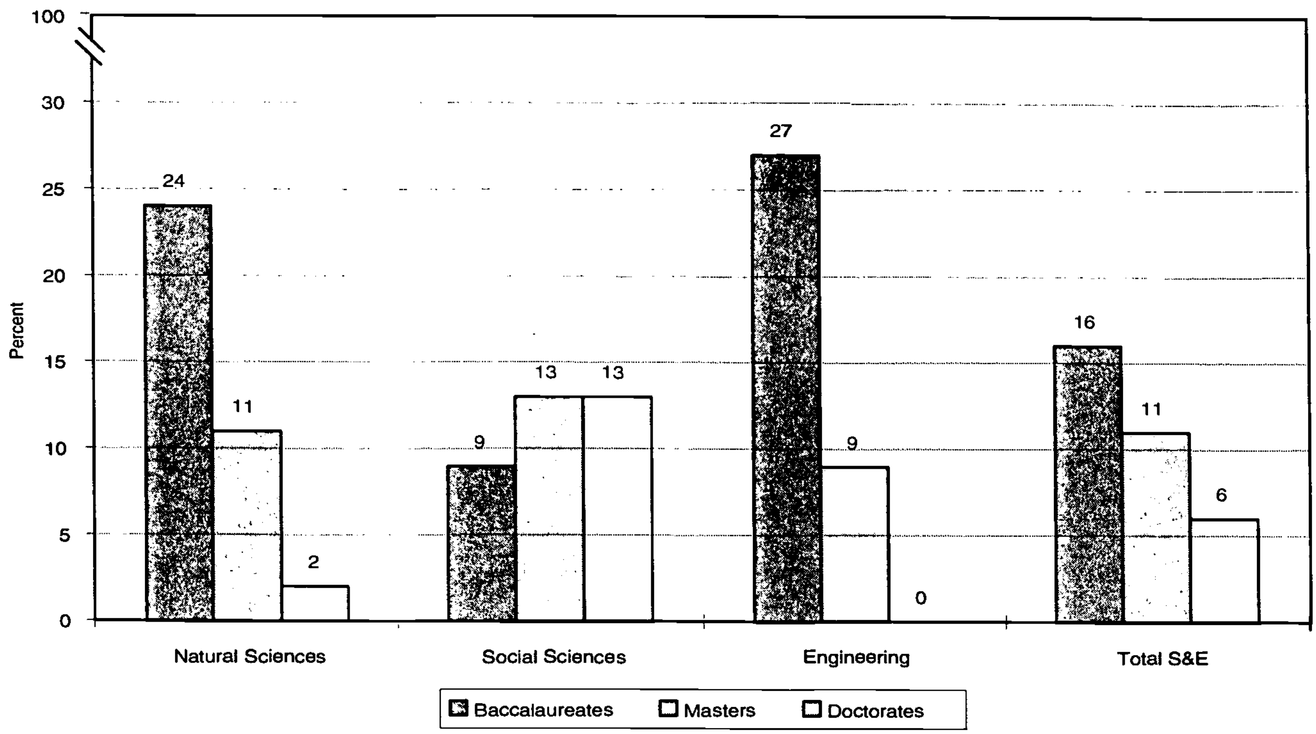
Universities in Puerto Rico accounted for 27 percent of the engineering bachelor's degrees awarded to Hispanics in the United States in 1995. Among natural science fields, Puerto Rican universities accounted for 26 percent of biological science and 39 percent of physical science bachelor's degrees awarded to Hispanics (NSF, 1997).

Of recent science and engineering bachelor's degree recipients from institutions in Puerto Rico, 35 percent attended graduate school. Of those who earned their bachelor's degree from Puerto Rican institutions and then earned a doctorate in science and engineering from 1991 to 1995, 75 percent earned their doctorates from universities on the continent and 25 percent from universities in Puerto Rico. Two universities in Puerto Rico—University of Puerto Rico at Rio Piedras and University of Puerto Rico at Mayaguez—provided doctorate education to the majority of science and engineering doctorate recipients from universities in Puerto Rico.

Degree Recipients in Science and Engineering From Universities in Puerto Rico *(continued)*

Figure 3-4.

Degrees conferred by institutions in Puerto Rico as a percentage of all degrees awarded to Hispanics in the United States



SOURCE: National Science Foundation/SRS. Science and Engineering Degrees, by Race/Ethnicity of Recipients: 1989–1995, tables 22-30.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Transition to Graduate Education

Analysis of data from the Graduate Record Examination (GRE) General Test shows that there are differences in mean scores among men and women in different racial/ethnic groups (Educational Testing Service, 1996). These findings may reflect differences in enrollment and outcome described elsewhere in this chapter.

According to a report on GRE performance released by the Educational Testing Service in 1996

- Men and women tend to have similar mean scores on the verbal and analytical measures; however, men have higher mean scores on the quantitative measure.
- Mean scores for non-U.S. citizens are higher than those for U.S. citizens on the quantitative measure and lower on the verbal and analytical measures.
- Whites tend to have higher mean scores than all other racial/ethnic groups on the verbal and analytical measures, whereas Asian Americans have higher mean scores on the quantitative measure.
- Mean scores on all measures are lowest for black and Puerto Rican examinees.
- Mean scores on each measure are higher for men than women across all racial/ethnic groups and measures.

Conclusion

The patterns described in this chapter provide evidence that disparity yet exists among racial/ethnic, gender, and disability categories. Although most bachelor's degrees in engineering, physical sciences, computer science, and agricultural sciences are earned by white males, trends suggest movement toward a greater representation of minorities within these fields. In some fields, women now earn half or more than half of all degrees awarded.

In addition to highlighting historical trends in enrollment and outcomes at the undergraduate level, several interesting findings emerged from the indices of representation. The proportion of white males

and females enrolled as undergraduates has declined since 1980, whereas racial/ethnic minorities have improved their representation in all undergraduate fields, including science, mathematics, and engineering. The rate of improvement among black males has been slower than that of all other minority groups. During the decade of the 1980s, the total number of bachelor's degrees awarded to all underrepresented minorities increased, including degrees in science and engineering.

Data on enrollment and outcomes for students with disabilities is insufficient for detailed analysis. One recent study (Seymour and Hunter, 1998) examines factors that may discourage students with disabilities from completing undergraduate degrees in science and engineering.

Also noteworthy was the role that Historically Black Colleges and Universities and colleges and universities in Puerto Rico play in educating black women and Hispanic students who go on to earn graduate degrees in the sciences and engineering.

Technical Notes to Chapter 3

Indices of Representation: College Enrollment (pages 43–50)

Indices of representation were computed by dividing the proportion of the category enrolled in college by the proportion of the category in the general population 18 through 24 years of age and then multiplying the results by 100.[9] For example, if white males were 35 percent of the general population 18 through 24 years of age in 1994, and 35 percent of the persons enrolled in 4-year institutions of higher education, the IR for white males would be 100. (See appendix table 3-20.) If a category is represented in the college population in the same proportion as it is represented in the general population, its index score will be 100. The term "parity" is used in this chapter to describe this situation. If a category has a higher proportion in the general population than it has in the college population, its index score will be less than 100. The term "underrepresentation" is used to describe this situation.

On the other hand, if a category has a lower proportion in the general population than it has in the college population, its index score will be greater than 100. The term "overrepresentation" is used to describe this situation. It should be kept in mind that a category may have a high index score, yet constitute a small proportion of the college population. For instance, if Asian females constitute 1.95 percent of the general population 18 through 24 years of age, and 2.71 percent of the persons enrolled in 4-year institutions of higher education, their IR score would be 139. (See appendix tables 3-20.)

Indices of Representation: Bachelor's Degrees Awarded (pages 50–56)

Indices of representation were computed to assess the relative representation of racial/ethnic and gender groups in the awarding of bachelor's degrees in 1994 and 1995. For 1994, the proportions of the racial/ethnic and gender groups among full-time, first-time, first-year students in 1990 were divided into the proportion of the racial/ethnic and gender groups receiving bachelor's degrees, and then multiplied by 100. Similarly, for 1995, the proportions of the racial/ethnic and gender groups among full-time, first-time, first-year students in 1991 were divided into the proportion of the racial/ethnic and gender groups receiving bachelor's degrees, and then multiplied by 100. This index can be interpreted similarly as the IR in college enrollment discussed earlier. It is noted that students take different lengths of time to complete a bachelor's degree program, and some programs, notably engineering, are longer than 4 years, but the IR should indicate patterns of differences among the racial/ethnic and gender groups in earning bachelor's degrees. The data for the development of the IRs excluded nonresident aliens and U.S. citizens and permanent residents for whom their race/ethnicity was unknown.

Students With Disabilities (pages 45–46)

Researchers selected the University of Minnesota for the study because of its strong reputation in science, mathematics, and engineering; a record of enrolling a significant number of students with disabilities; and its well-established Office of Disability Services. Within the University of Minnesota, the Institute of Technology (IT) offers degrees in several engineering disciplines, as well as physics, astronomy, chemistry, geology, mathematics, and computer science. University of Minnesota IT students who had registered with the Disabled Services (DS) office of the university were invited to participate in this confidential study. They included 41 of the 93 full-time undergraduates registered at the IT in fall 1993, and a small (N=19) sample of recent graduates (that is, 1 to 5 years since graduation) who were working in the Twin Cities area.

[9] Population estimates from the U.S. Bureau of the Census were used for the general population data. These data included nonresident aliens, persons excluded from the college enrollment data. This difference will have the effect of reducing the Index of Representation for all of the categories. The Census data were obtained from the following reports: U.S. Bureau of the Census, *Current Population Reports, P25-1092*, "Population Projections of the United States, by Age, Sex, Race, and Hispanic Origin: 1992 to 2050." U.S. Government Printing Office, Washington, DC 1992; U.S. Bureau of the Census, *Current Population Reports, P25-1095*, "U.S. Population Estimates, by Age, Sex, Race, and Hispanic Origin: 1980 to 1991." U.S. Government Printing Office, Washington, DC 1993; U.S. Bureau of the Census, *Current Population Reports, P25, No. 601*, "Projections of the Population of the United States: 1975 to 2050," U.S. Government Printing Office, Washington, DC, 1975.

The total number of participants was 65, of whom 60 were IT undergraduates or graduates, and 5 of whom were undergraduates with disabilities majoring in disciplines other than science, mathematics, and engineering.

The students participated in interviews and focus groups, varying in length from 45 to 90 minutes. Interviews were conducted in the style of a focused conversation.

Like students in both public and private institutions, students who register themselves as having a disability at the University of Minnesota have access through the Office of Disability Services to a system of services. Such services were developed first in compliance with the Federally mandated 504 Regulations (1977), which required postsecondary institutions to make all programs accessible to qualified students with disabilities and provide reasonable accommodations, in accordance with the Americans with Disabilities Act (1990).

American Indians in Higher Education (page 42)

The McAfee (1997) study was ethnographic in nature, it examined the experiences of 43 American Indians enrolled in nine undergraduate institutions in eight western states. Of those, 23 had left school. Of that number, only 22 percent were perceived to have a strong identity with their traditional cultures. By comparison, 50 percent of the 16 who had completed baccalaureate degrees were thought to have strong ties to their American Indian heritage.

References

Adelman, Clifford. 1995. *The New College Course Map and Transcript Files: Changes in Course-Taking and Achievement, 1972–1993* (NCES PE 95-800). Washington, DC: U.S. Department of Education, National Center for Education Statistics.

Adelman, Clifford. 1997. Community Colleges: Drop-in Centers No More. *The Washington Post,* April 15, 1997, p. A19.

Adelman, Clifford. 1998. *Women and Men of the Engineering Path: A Model for Analysis of Undergraduate Careers.* Washington, DC: U.S. Department of Education and the National Institute for Science Education.

Arnold, K.D. 1987. Values and vocations: The career aspirations of academically-gifted females in the first five years after high school. (Paper presented at the Annual Meeting of the American Educational Research Association, Washington, DC.)

Astin, H.S.,and L.J. Sax. 1996. Developing Scientific Talent in Undergraduate Women. In Cinda-Sue Davis, Angela B. Ginorio, Carol S. Hollenshead, Barbara B. Lazarus, and Paula M. Rayman (Eds.), *The Equity Equation: Fostering the Advancement of Women in the Sciences, Mathematics and Engineering.* San Francisco, CA: Jossey-Bass Publishers.

Boyer, Paul. 1997. Native American Colleges: Progress and Prospects. Princeton, NJ: The Carnegie Foundation for the Advancement of Teaching.

Educational Testing Service, Graduate Records Examination Board. 1996. *Sex, Race, Ethnicity, and Performance on the GRE General Test: A Technical Report.* Princeton, NJ: Educational Testing Service.

Hall, R.M., and B. Sandler. 1982. *The classroom climate: A chilly one for women?* Project on the Status and Education of Women. Washington, DC: Association of American Colleges.

Hanson, S.L. 1997. *Lost Talent: Women in the Sciences.* Philadelphia, PA: Temple University Press.

Kimball, M.M. 1989. A new perspective of women's math achievement. *Psychological Bulletin*, 105(2), 198–214.

Leggon, C.B., and W. Pearson, Jr. 1997. The Baccalaureate Origins of African American Women Female Ph.D. Scientists. *Journal of Women and Minorities in Science and Engineering*, 3(4), 213–224.

Manis, J., S. Frazier-Kouassi, C. Hollenshead, and D. Burkham. 1993. *A survey of the graduate experience: Sources of satisfaction and dissatisfaction among graduate students at the University of Michigan.* Ann Arbor, MI: The University of Michigan Center for the Education of Women.

Manis, J.D., N.G. Thomas, B.F. Sloat, and C.S. Davis. 1989. An analysis of factors affecting choices of majors in science, mathematics, and engineering at the University of Michigan (CEW Rep. No. 23). Ann Arbor, Michigan: University of Michigan, Center for Continuing Education of Women.

McAfee, M.E. 1997. From Their Voices: American Indians in Higher Education and the Phenomenon of Stepping Out (A report to the Alfred P. Sloan Foundation) New York, NY: Alfred P. Sloan Foundation.

National Science Foundation. 1994. *Women, Minorities, and Persons With Disabilities in Science and Engineering: 1994* (NSF 94-333). Arlington, VA: National Science Foundation.

National Science Foundation. 1996. *Women, Minorities, and Persons With Disabilities in Science and Engineering: 1996* (NSF 96-311). Arlington, VA: National Science Foundation.

National Science Foundation. 1997. *Science and Engineering Degrees, by Race/Ethnicity of Recipients, 1989–95* (NSF 97-334). Arlington, VA: National Science Foundation.

Oakes, J. 1990. Opportunities, achievement and choice: Women and minority students in science and mathematics. In C.B. Casden (Ed.), *Review of Educational Research* (Vol. 16). pp. 153–222.

Seymour, E., and N.M. Hewitt. 1997. *Talking About Leaving: Why Undergraduates Leave the Sciences.* Boulder, CO: Westview Press.

Seymour, E., and A. Hunter. 1998. *Talking About Disability: The Education and Work Experiences of Graduates and Undergraduates with Disabilities in Science, Mathematics, and Engineering Majors.* Washington, DC: American Association for the Advancement of Science.

Strenta, C., R. Elliott, M. Matier, J. Scott, and R. Adair. 1993. Choosing and leaving science in highly selective institutions: General factors and the question of gender (Report to the Alfred P. Sloan Foundation). New York, NY: Alfred P. Sloan Foundation.

U.S. Bureau of the Census. 1975. Projections of the Population of the United States: 1975 to 2050. *Current Population Reports, P25, No. 601.* Washington, DC: U.S. Government Printing Office.

U.S. Bureau of the Census. 1992. Population Projections of the United States, by Age, Sex, Race, and Hispanic Origin: 1992 to 2050. *Current Population Reports, P25-1092.* Washington, DC: U.S. Government Printing Office.

U.S. Bureau of the Census. 1993. U.S. Population Estimates, by Age, Sex, Race, and Hispanic Origin: 1980 to 1991. *Current Population Reports, P25-1095.* Washington, DC: U.S. Government Printing Office.

U.S. Department of Education, National Center for Education Statistics. 1996. Digest of Education Statistics 1996 (NCES 96-133). Washington, DC: U.S. Department of Education/NCES.

Ware, N.C., and D. Dill. 1986. Persistence in science among mathematically able male and female college students with pre-college plans for a scientific major. (Paper presented at the Annual Meeting of the American Educational Research Association).

Chapter 4

Graduate Education

Enrollment

Overview

Graduate education in the United States sets a world standard; it is highly regarded not only by students in this country but also by persons from abroad. Graduate education constitutes a critical step in the preparation of most scholars and professionals. In pursuing graduate training, students must be more focused and directed in what courses they take.

Graduate school enrollment in the United States in science and engineering continued to increase over the 1985–1995 decade, from 358,126 students in 1985 to 423,922 students in 1995. (See appendix table 4-1.) In the most recent years (1993–1995), however, enrollment decreased by 3 percent. In addition, the composition of enrollment in graduate education in science and engineering fields became more diverse.

Women increased not only their numbers but also their share of total graduate enrollment, slowly becoming a majority in graduate enrollment in all fields combined (Syverson and Welch, 1996). Progress has been slower in science and engineering fields, where women and minorities (with the exception of Asian students) continue to be underrepresented in graduate school.[1] Women registered gains over the 1985–1995 decade in graduate enrollment, however, and underrepresented minorities made more limited progress.

Women

Enrollment Composition

Women's graduate enrollment in the science and engineering fields, at 160,864 students in 1995, has increased 45 percent from 1985 enrollment of 110,662. (See figure 4-1 and appendix table 4-2.) During the same period, the number of male science and engineering graduate students reached 263,058, a 6 percent increase from 247,464 in 1985. (See appendix table 4-3.) Graduate enrollment steadily increased in almost all fields until 1993 when small changes within fields resulted in decreases. In some cases, this was the first time in 20 years that decreases had occurred. These changes had an effect on total graduate enrollment in 1995. (See appendix table 4-1.) Although total enrollment decreased 3 percent and male enrollment decreased 6 percent between 1993 and 1995, the number of female students grew by 3 percent from 156,757 in 1993 to 160,864 in 1995. (See appendix table 4-2.) Most of the increase in the number of women graduate students can be attributed to increased enrollment in the social sciences, (to 42,274), psychology (to 38,142), and the biological sciences (to 28,819) in 1995. Not surprisingly, biological sciences, psychology, and social sciences command the largest proportions of women science students: 20 percent, 27 percent, and 30 percent, respectively, and the largest numbers of female graduate students. (See figures 4-2 and 4-3.)

Changes in Enrollment

Female graduate science enrollment rose by 43 percent from 99,582 in 1985 to 142,712 in 1995. The increase has slowed recently, however; an increase of only 3 percent occurred from 1993 to 1995. As a proportion of total female science and engineering graduate enrollment, women enrolling in engineering increased from 10 to 11 percent. (See appendix table 4-2.) Female enrollment in the physical sciences increased 40 percent between 1985 and 1995, although it has decreased 1 percent since 1993. Other major science fields in which female enrollment decreased from 1993 to 1995 were mathematics (6 percent) and computer science (4 percent). (See appendix table 4-2.)

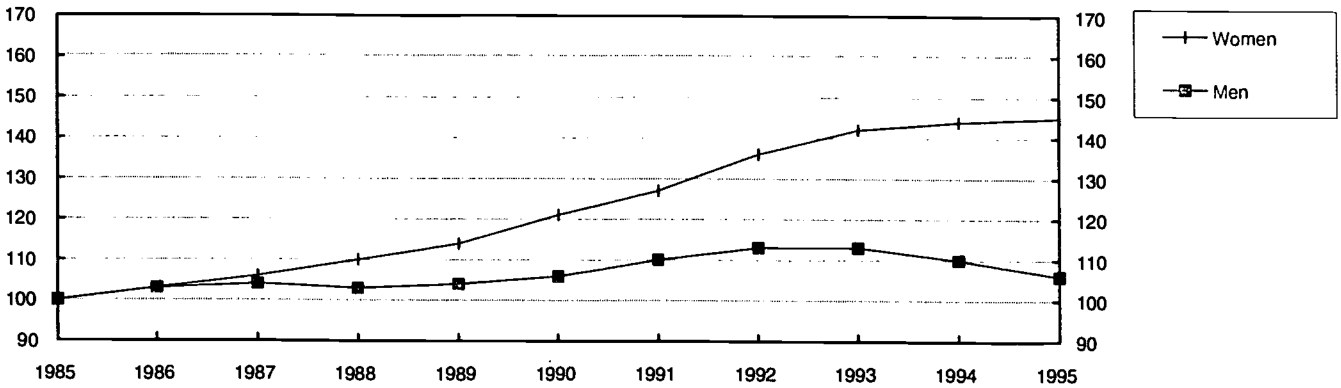
Female enrollment in earth, atmospheric, and ocean sciences increased by 40 percent between 1985 and 1995. As noted previously, most female graduate enrollment is concentrated in the biological sciences, psychology, and social sciences, and all had increases

[1] It must be noted that over the last decade women and minorities have made progress in the proportion of their participation in science and engineering fields. Because of the nature of calculating percentage changes, in many instances the largest increases are often within the populations that had the lowest numbers at the outset. Therefore, the reader is cautioned that the percentage change data for certain minority groups, although impres- [illegible] may not reflect very large increases in absolute numbers.

Figure 4-1.

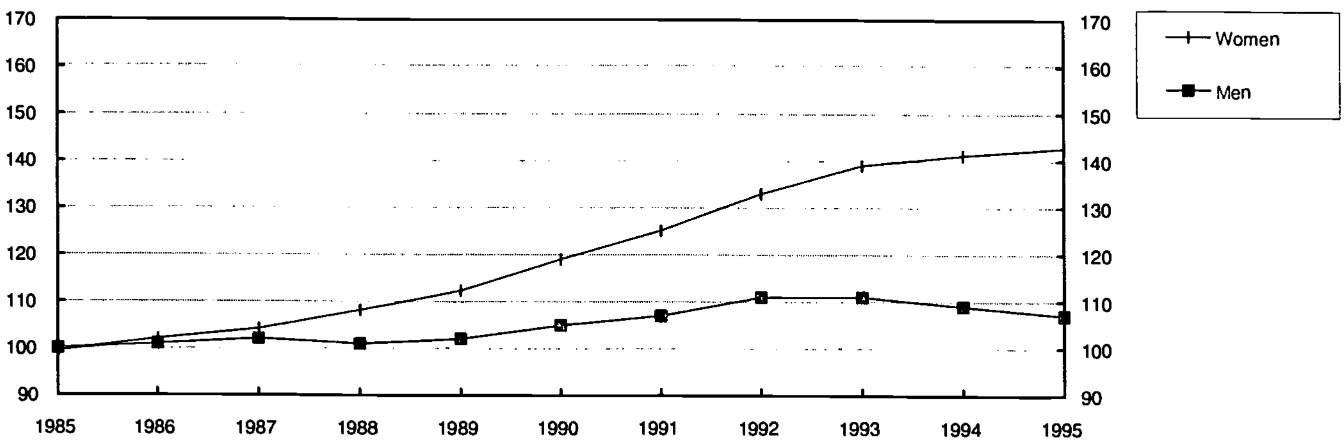
Graduate science and engineering enrollment growth rate by sex: 1985–1995

Index: 1985 = 100



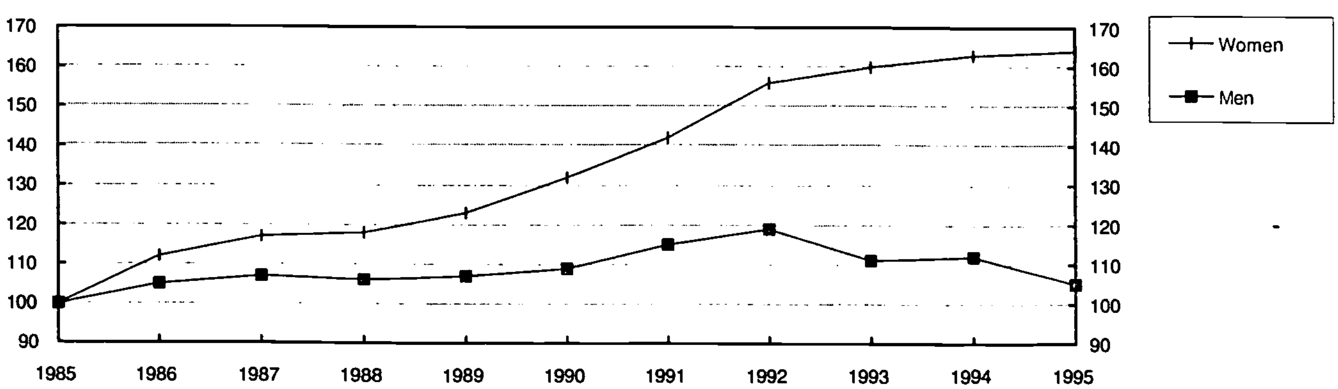
Graduate science enrollment growth rate by sex: 1985–1995

Index: 1985 = 100



Graduate engineering enrollment growth rate by sex: 1985–1995

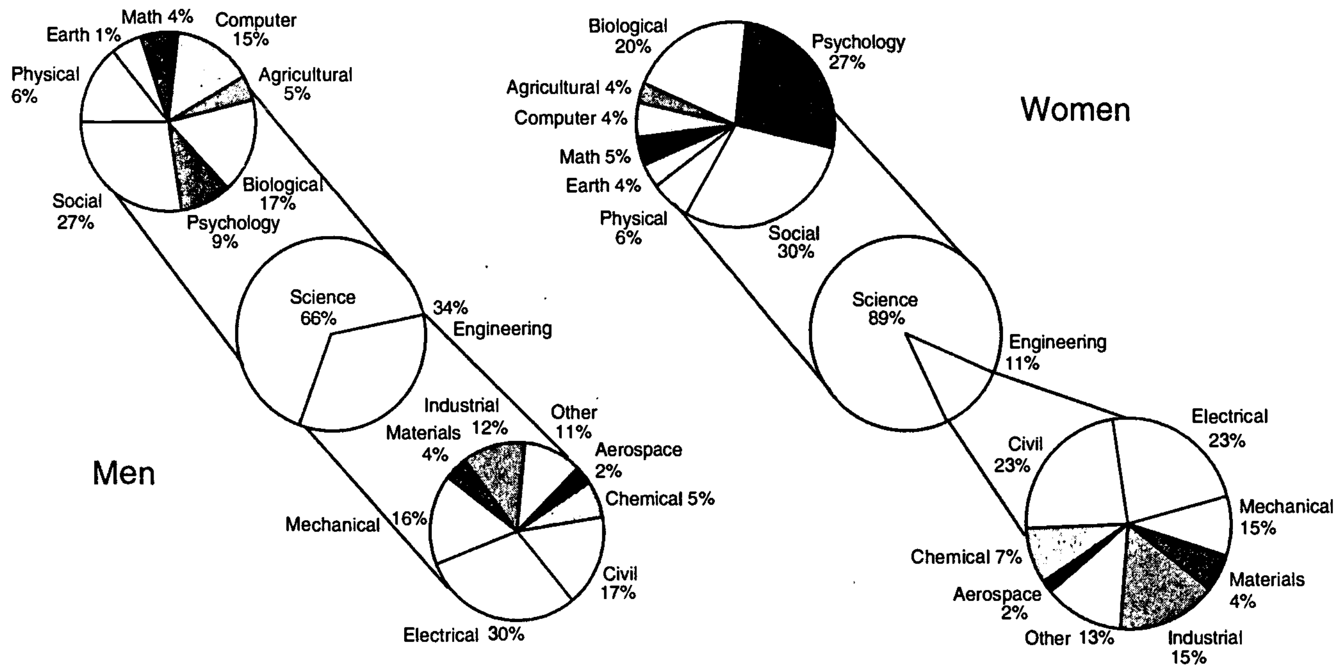
Index: 1985 = 100



See appendix tables 4-2 and 4-3.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

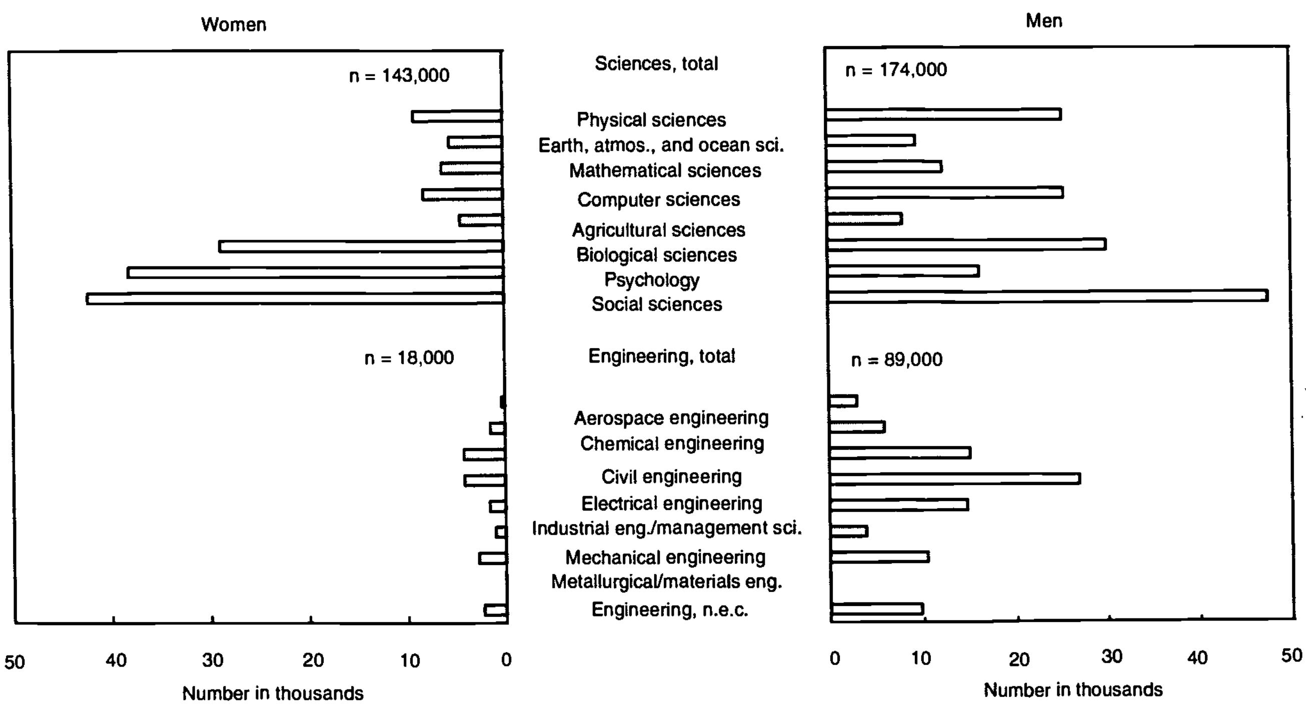
Figure 4-2.
Science and engineering graduate students, by field of enrollment: 1995



See appendix tables 4-2 and 4-3.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Figure 4-3.
Science and engineering enrollment, by field and gender: 1995



See appendix tables 4-2 and 4-3.

of approximately 50 percent between 1985 and 1995. (See appendix table 4-2.) Female enrollment in engineering fields increased 64 percent between 1985 and 1995, with the increase slowing to 3 percent between 1993 and 1995. Three of the eight engineering fields had decreases in the number of women graduate students between these 2 years: aerospace (2 percent), electrical (3 percent), and mechanical (6 percent). Engineering comprises 11 percent of female science and engineering enrollment; civil engineering and electrical engineering both comprise less than 3 percent. Astronomy, other geosciences,[2] and aerospace engineering had the largest increases in the number of women graduate students from 1985 to 1995 (107, 172, and 115 percent, respectively), although their share of total science and engineering remains very small. (See appendix table 4-2.)

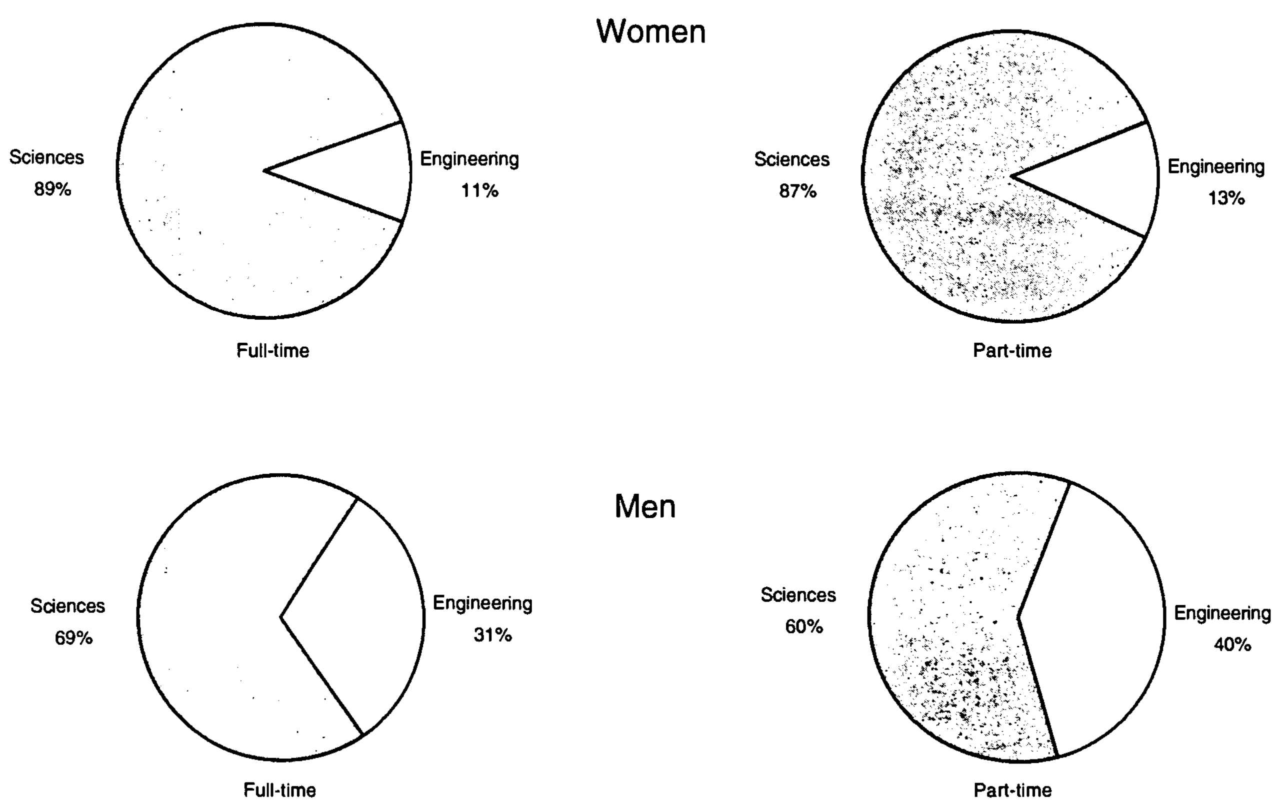
[2] "Other geosciences" includes such fields as conservation, environmental chemistry, environmental science, environmental science/planning, environmental studies, and natural resources.

Enrollment Status

An increasing percentage of the full-time graduate science and engineering student population are women. (See appendix tables 4-4 and 4-5.) Of the 107,805 women enrolled in science and engineering full time, 89 percent were in science fields in 1995 compared to full-time male science enrollment of 69 percent. (See figure 4-4.) Full-time female enrollment in graduate science and engineering programs increased 54 percent from 1985, compared to a male enrollment increase of 10 percent. Since 1993, female enrollment increased 4 percent when male enrollment decreased 6 percent. (See appendix tables 4-5 and 4-6.) Male enrollment continues to dominate the engineering fields, though there has been a 10 percent decrease in full-time male enrollment since 1993. (See appendix table 4-6.) Women, on the other hand, slightly increased their full-time engineering enrollment by 3 percent from 1993 to 1995. Women made long strides overall from 1985 to 1995 with an 84 percent increase

Figure 4-4.

Science and engineering graduate students by enrollment status and gender: 1995



See appendix tables 4-5, 4-6, 4-8, and 4-9.

in full-time engineering enrollment compared to men's 14 percent increase during the same period. Male enrollment in full-time science and engineering programs decreased in every field except biological sciences since 1993.

Female part-time graduate student enrollment in science was 87 percent of all female part-time science and engineering enrollment compared to men's 60 percent in 1995. (See figure 4-4.) Unlike the increase in female full-time enrollment, the part-time graduate enrollment in science and engineering for women of 53,059 in 1995 (39 percent of all part-time science and engineering graduate students) represented a 1 percent decline from the 1993 enrollment of 53,502. (See appendix table 4-7 and 4-8.) In comparison, however, enrollment for men also declined between 1993 and 1995: the 1995 enrollment of 82,847 was smaller than the 1993 enrollment of 88,504 by 6 percent. (See appendix table 4-9.) Female part-time enrollment decreased in the sciences but increased in engineering from 1993 to 1995 by 2 percent. Part-time female graduate enrollment increased 30 percent between 1985 and 1995. (See appendix table 4-8.) Male part-time graduate enrollment decreased 1 percent during that same period. (See appendix table 4-9.)

Sources of Financial Support

In 1995, both men and women in graduate engineering programs reported comparable means of financial support. The proportions relying primarily on self support were nearly the same, 27 percent for men and 29 percent for women. (See figure 4-5.) Only in the aerospace engineering field was there a notable gender difference in the proportions of students relying on self support, 20 percent for men and 13 percent for women. (See appendix table 4-10.)

In science, institutional support was the primary source of support for 45 percent of male and 43 percent of female graduate students. Female graduate students were more likely than males to be self supported (35 percent versus 26 percent). In computer sciences, psychology, and social sciences, close to 50 percent of women and about 40 percent of men relied on self support. In mathematics, almost equal proportions of men, 69 percent, and women, 67 percent, received institutional support.

Graduate Schools

The graduate school with the largest number of female graduate students in 1995 was the University of Minnesota (all campuses), which had 1,880 female graduates enrolled. (See figure 4-6.) This university has been the top graduate school in female enrollment for 8 of the past 10 years. George Washington University increased its female enrollment over 100 percent, from 818 students in 1985 to 1,662 in 1995. Indiana University (all campuses) also increased its female enrollment by 100 percent, from 587 female students in 1985 to 1,423 female students in 1995. (See appendix table 4-11.)

In 1995, 4,489 science and engineering graduate students enrolled in Historically Black Colleges and Universities (HBCUs) of which 2,206 were women. Female graduate students increased their enrollment in HBCUs by 68 percent from 1985 to 1995. (See appendix tables 4-12 and 4-13.)

Minorities

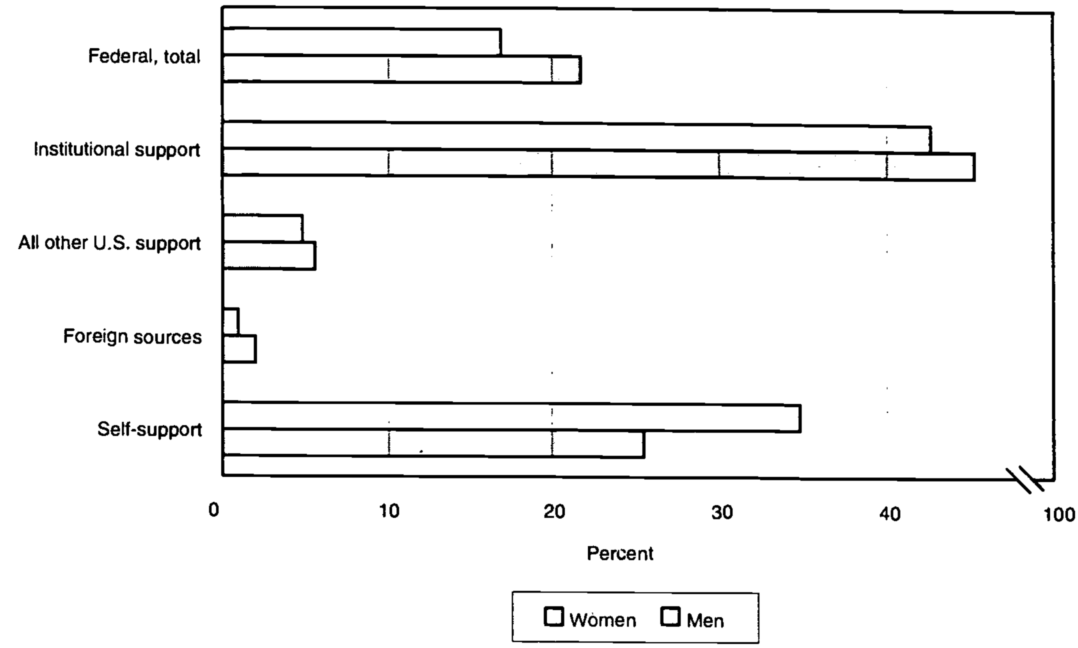
Enrollment Composition

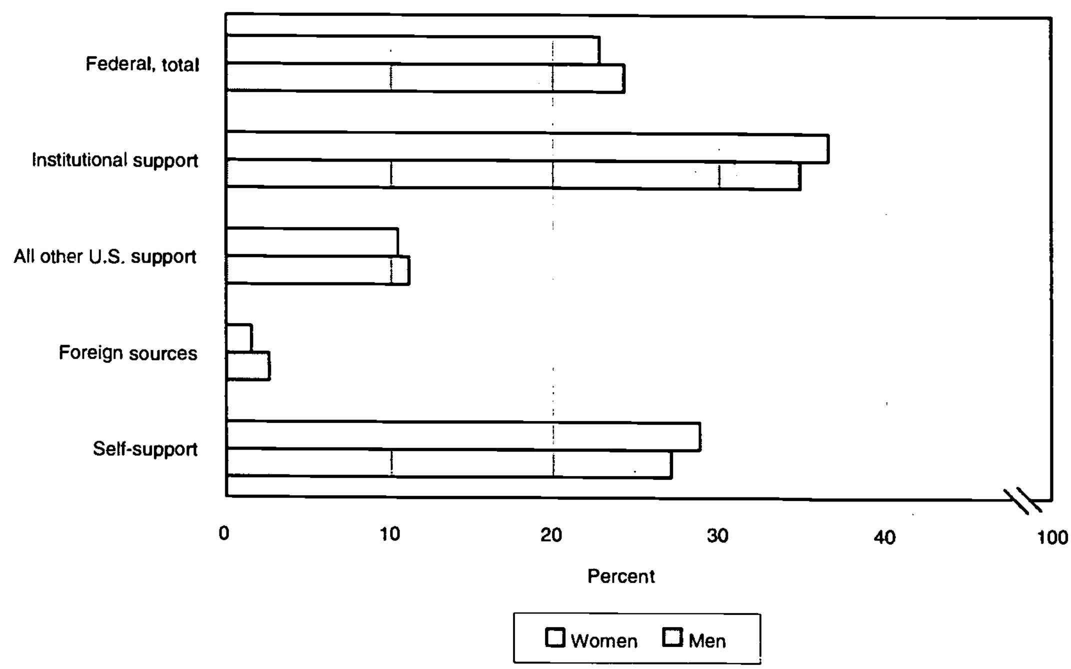
Of the 325,135 U.S. citizen and permanent resident students enrolled in graduate science and engineering programs in 1995 (both full time and part time) (see appendix table 4-14), 14 percent were minorities. Blacks (6 percent), American Indians (1 percent), and Hispanics (4 percent), continued to be substantially underrepresented. (See appendix tables 4-15, 4-16, and 4-17.) Asian students were 8 percent of graduate science and engineering enrollment. (See appendix table 4-18.)

Blacks

For black students, the increase in graduate science and engineering enrollment from 1985 to 1995 was 76 percent, an increase of approximately 8,000 students. In science, black enrollment was up 71 percent from 1985, from 9,066 students to 15,494 in 1995. (See figure 4-7.) Of the major fields, agricultural science, although numbers are small, increased its enrollment of black graduate students from 137 in 1985 to 293 students in 1995. Psychology and computer science fields almost doubled their enrollment of black graduate students during this period increasing 91 percent, adding 1,632 students into these fields. Over a third of black students were enrolled in social science. (See figure 4-8.) Of the 6,907 social science students enrolled in 1995, the largest field was political science with 3,559 students. Physics, atmospheric science, other geosciences, anthropology, and history of science, whose black enrollment more than doubled or tripled between 1985 and 1995, increased their black enrollment in these fields combined by 214 students. Engineering enrollment also doubled for blacks between 1985 and 1995, increasing 107 percent from 1,387 in 1985 to 2,872 in 1995, adding 1,485 students. Between 1993 and 1995, decreases

Figure 4-5.
Primary source of support for full-time science and engineering graduate students in science, by sex: 1995

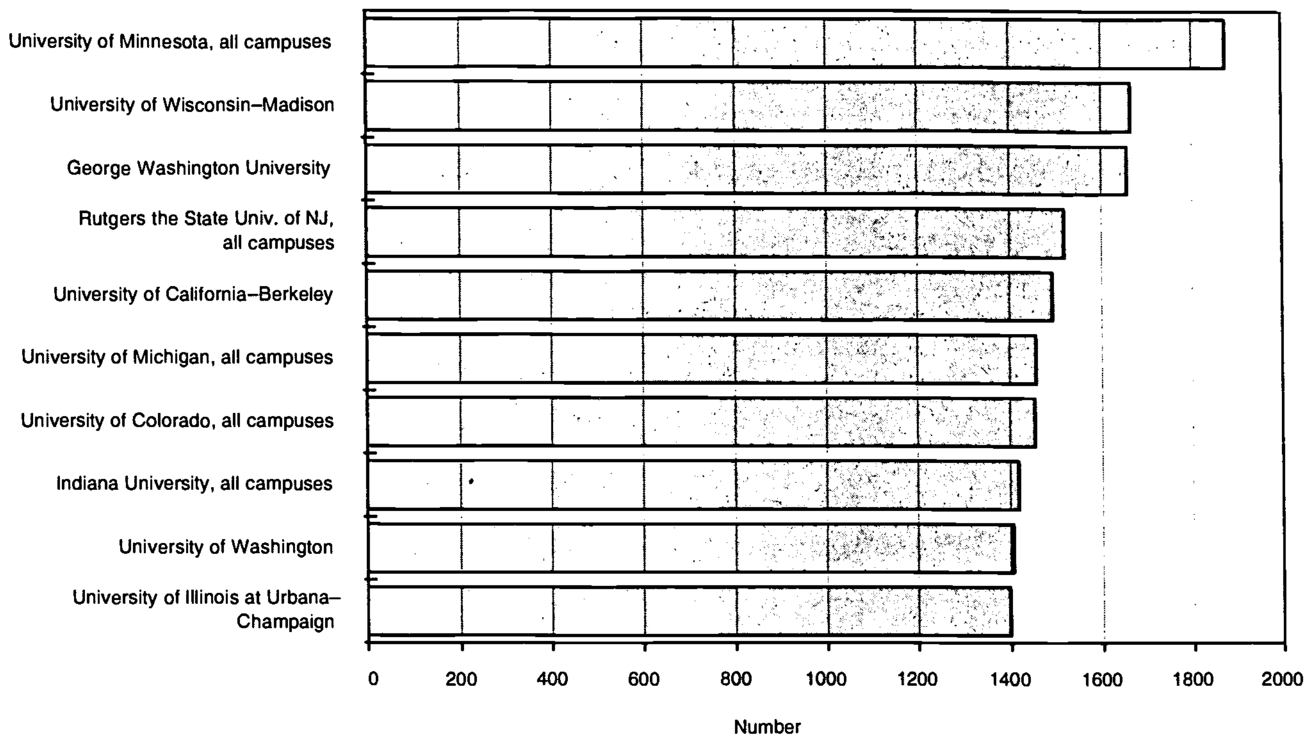




See appendix table 4-10.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

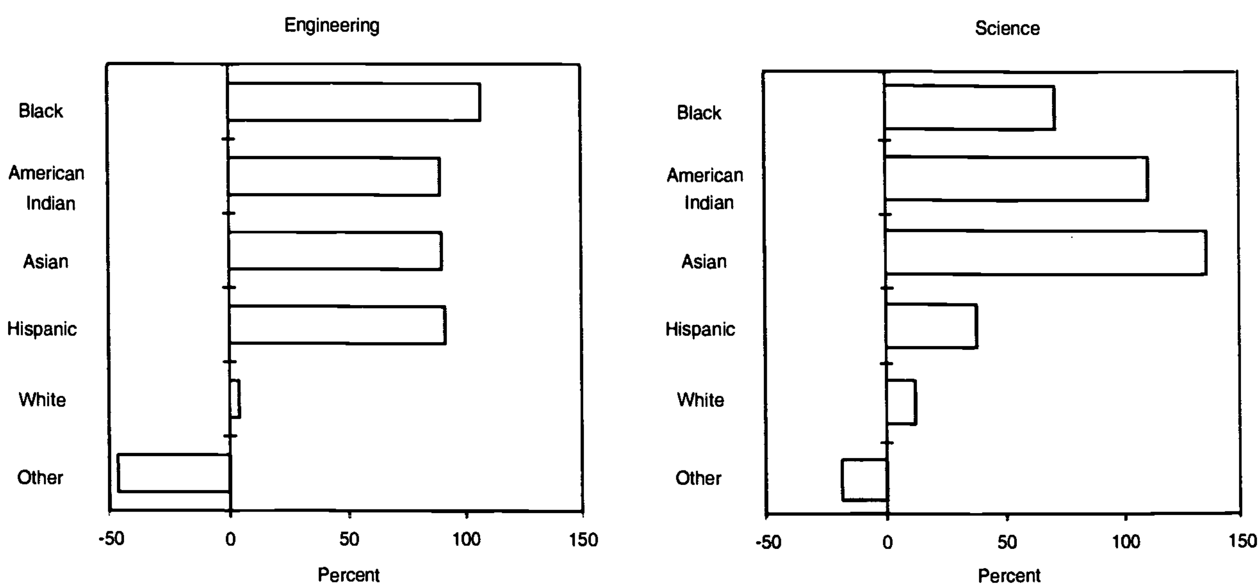
Figure 4-6.
Female graduate science and engineering enrollment, by institutional rank: 1995



See appendix table 4-11.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Figure 4-7.
Percentage change in science and engineering enrollment, by field and race/ethnicity of U.S. citizens and permanent residents: 1985–1995



See appendix tables 4-15 and 4-20.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

in black student enrollment were small, losing fewer than 80 students in science subfields and fewer than 50 students in engineering subfields. (See appendix table 4-15.)

American Indians

There were 1,524 American Indians enrolled in science and engineering in 1995, an increase of 107 percent from 737 students enrolled in 1985.[3] In science, enrollment increased 110 percent adding 688 students from 1985 to 1995. The fields with the largest concentrations of these graduate students were biological sciences (214 students), psychology (331 students), and social sciences (434 students). American Indian enrollment in engineering increased over 100 students from 1985 to 1995. (See appendix table 4-16.)

Hispanics

Hispanic students increased their graduate science and engineering enrollment by 64 percent between 1985 (8,614) and 1995 (14,089). Students enrolling in science fields totaled 11,258 students in 1995, a 58 percent increase from 7,133 in 1985. Enrollment in all major fields of science increased between 1985 and 1995, except in agricultural sciences which decreased 10 percent. Biological science (1,810), psychology (2,777), and social science (4,221) have the largest numbers and proportions of Hispanic graduate students in science. (See figure 4-8.) Political science is the largest of the social science fields and comprised 14 percent of all Hispanic science and engineering student enrollment. Engineering enrollment for Hispanics increased 5 percent from 1,481 students in 1985 to 2,831 students in 1995. (See appendix table 4-17.)

Asians

Asian students increased their graduate enrollment in science and engineering by 117 percent, from 12,003 in 1985 to 26,015 in 1995. Asian graduate student enrollment in science fields in 1995 (16,897) increased 135 percent from 1985 (7,198), and doubled, tripled, and sometimes quadrupled within some fields. Asian student enrollment in engineering (9,118) increased 90 percent. The largest numbers of Asian engineering students are in the subfields of civil engineering (1,360), mechanical engineering (1,243), and electrical engineering (3,762). Although the combined Asian enrollment in science and engineering yielded an increase of 8 percent between 1993 and 1995, there were decreases of about 400 students combined in various subfields of physical sciences, earth sciences, and engineering. (See appendix table 4-18.)

Whites

White students increased their science and engineering enrollment by 10 percent between 1985 (223,682) and 1995 (246,776). (See appendix table 4-19.) Students enrolling in science fields totaled 194,663 students in 1995, a 12 percent increase from 173,541 in 1985. For nearly half of the major fields in science, however, enrollment decreased. Engineering enrollment increased 4 percent between 1985 and 1995. White graduate student enrollment in science and engineering decreased 4 percent between 1993 and 1995; in engineering only, enrollment decreased 9 percent.

Unknown Race/Ethnicity

Graduate students in science and engineering whose race and ethnicity were not specified were 9 percent of U.S. citizen and permanent resident graduate students in 1985 and 6 percent in 1995 (a decrease in numbers of 29 percent), probably reflecting better reporting of race/ethnicity; however, this group increased 5 percent during 1993 to 1995. (See appendix table 4-20.)

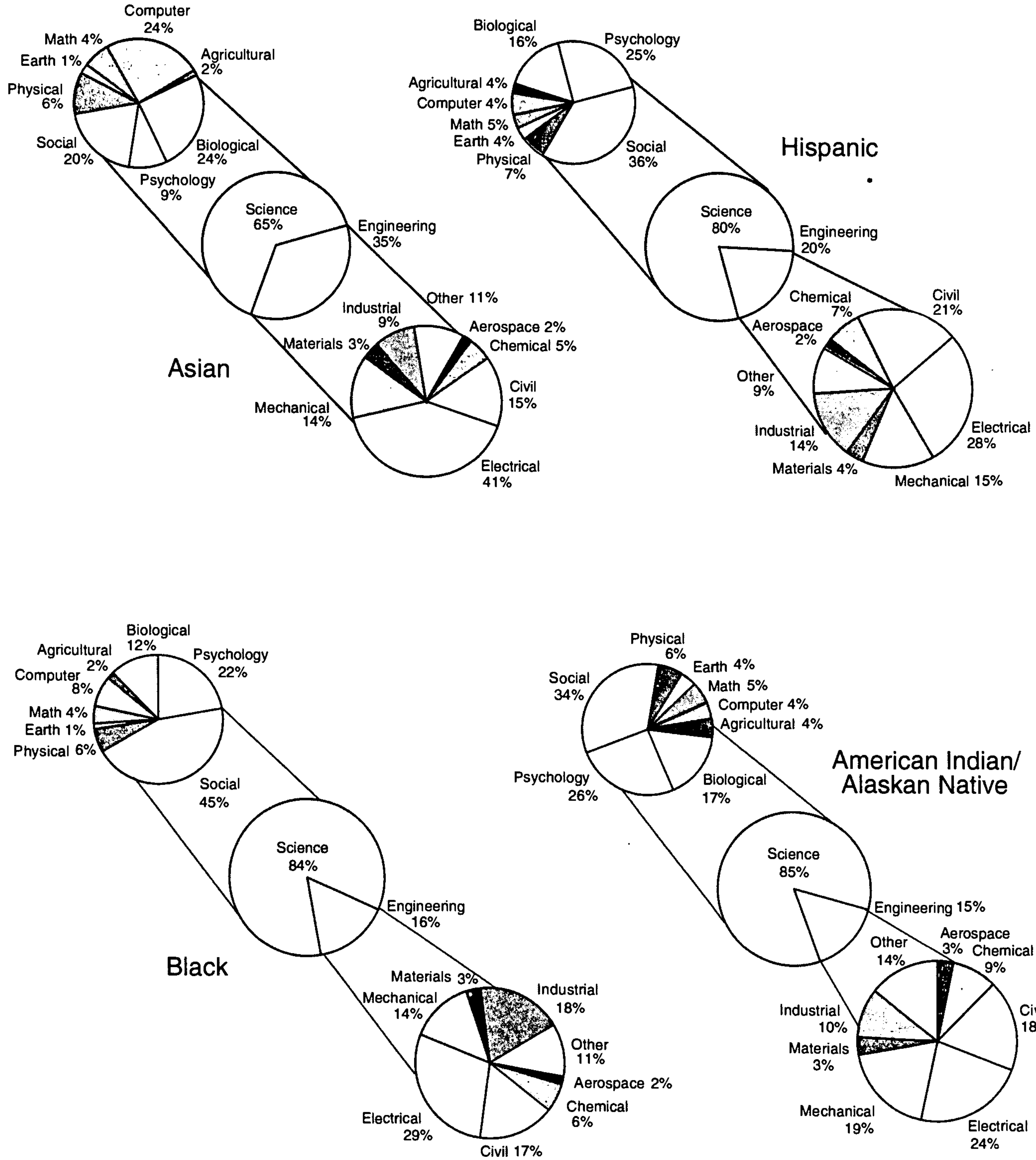
Race by Gender

Of the 325,135 U.S. citizen and permanent resident science and engineering graduate students enrolled in colleges and universities in this country in 1995, 134,643 were female, representing 41 percent (see appendix table 4-21). Of the female science and engineering students in 1995, 21 percent were minorities; in 1994, 20 percent. Blacks represented 8 percent, American Indians 1 percent, Asians 7 percent, and Hispanics 5 percent. Of the male graduate science and engineering students (190,492) in 1995, the portion who were black was 4 percent, American Indians less than 1 percent, Asians 9 percent, and Hispanics 4 percent.

The enrollment of racial/ethnic minority graduate students is most prominent in the social sciences except for Asian students who are prominent in engineering fields. Black, American Indian, and Hispanic females tend to be concentrated in the social sciences, whereas Asian female students are concentrated in the biological sciences. White female students are in

[3] Some of this increase may be due to changes in racial identification. Between the 1970 and 1980 censuses and between the 1980 and 1990 censuses, the number of American Indians increased in excess of natural increase because many multiracial persons who had not previously self-identified as American Indian changed their racial identity to American Indian (Eschbach et al. 1998).

Figure 4-8.
Science and engineering graduate students, by field of enrollment: 1995



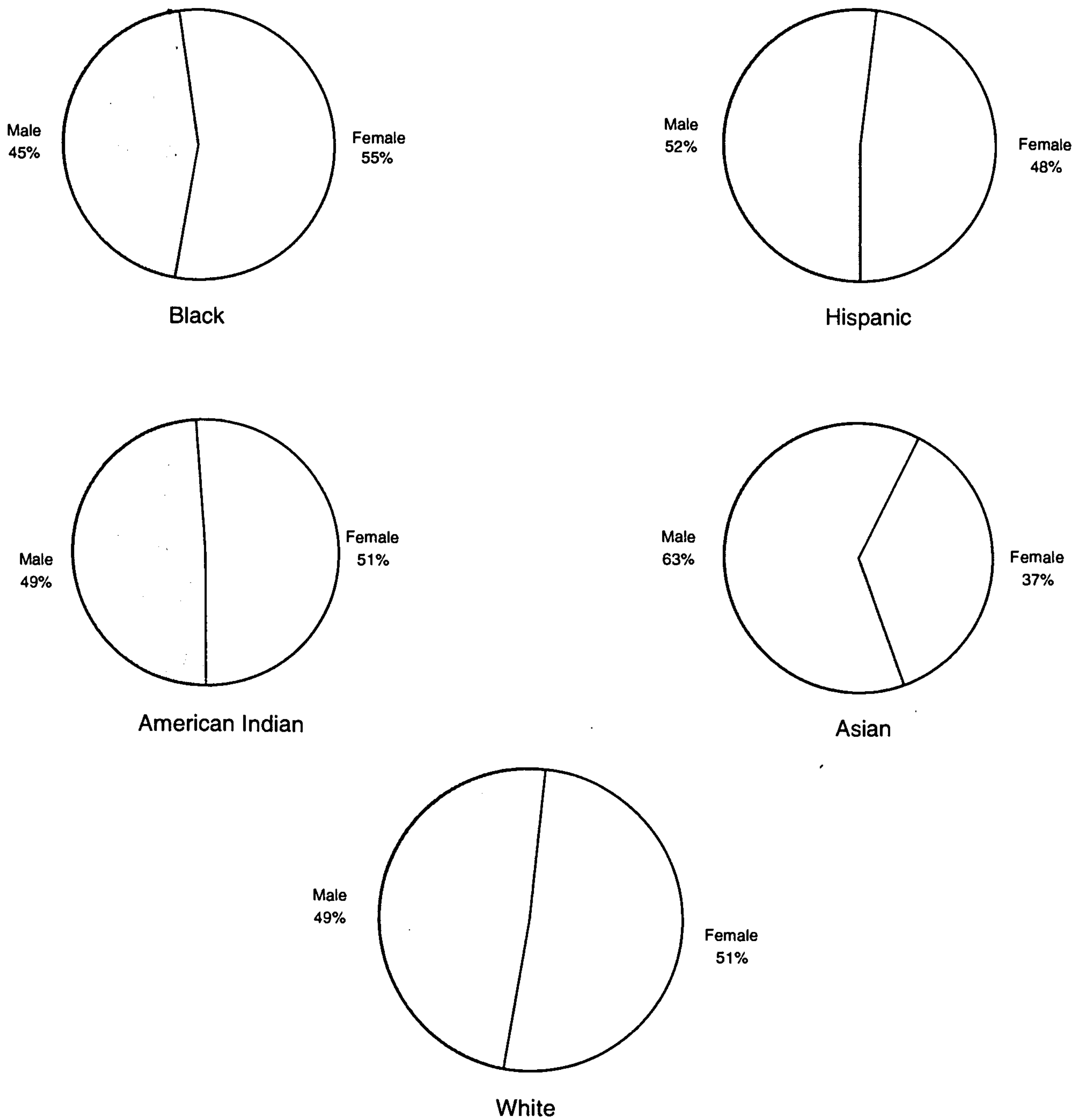
See appendix tables 4-15 to 4-18.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

psychology and social sciences. Of the male graduate students, all minorities except Asian men are most heavily represented in social sciences. Asian and white males' enrollment is concentrated in engineering. Women were 55 percent of black science and engineering enrollment, 51 percent of American Indian science and engineering enrollment, 37 percent of Asian science and engineering enrollment, and 48 percent of Hispanic science and engineering enrollment. (See figure 4-9 and appendix table 4-21.)

Figure 4-9.

Science and engineering graduate students by race and gender: 1995



See appendix table 4-21.

Foreign

Foreign students enrolled in U.S. science and engineering graduate programs totaled 98,787 students in 1995, up 29 percent from 76,812 students in 1985. There were 63,300 foreign students enrolled in science fields, up 32 percent from 47,990 in 1985. Enrollment in all major science fields increased for foreign students between 1985 and 1995. Though enrollment in social sciences combined increased, enrollment in three social science fields decreased between 1985 and 1995; sociology (down 17 percent), linguistics (down 7 percent), and history of science (down 7 percent). Engineering enrollment for foreign students was up 23 percent between 1985 and 1995. Civil engineering (5,600), electrical engineering (11,308), and mechanical engineering (5,442) had the largest portions of foreign enrollment in the engineering fields. (See appendix table 4-22.)

Between 1993 and 1995, enrollment of foreign graduate students in science and engineering decreased 7 percent, science by 5 percent, and engineering by 10 percent. Foreign enrollment in all major science fields decreased during this period except for psychology, which was up 11 percent. Foreign enrollment in all engineering fields also decreased between 1993 and 1995. (See appendix table 4-22.)

Full Time and Part Time

In 1995, 68 percent of graduate science and engineering students were enrolled full time and 32 percent were enrolled part time. Among U.S. citizen and permanent resident graduate science and engineering students, 89 percent were full time and 11 percent were part time. (See appendix table 4-23.)

Between 1985 and 1995, minority U.S. citizen and permanent resident graduate students increased their full-time enrollment in science and engineering: black graduate students (91 percent); American Indian graduate students (122 percent); Asian graduate students (132 percent); and Hispanics (76 percent). Full-time foreign science and engineering graduate student enrollment increased by 27 percent between 1985 and 1995. Part-time enrollment for minority U.S. citizen and permanent resident graduate students, and for foreign students also increased between 1985 and 1995. Between 1993 and 1995, full-time foreign student and white U.S. citizen and permanent resident student enrollment decreased 7 percent and 2 percent, respectively. Part-time enrollment of Hispanic graduate students decreased between 1993 and 1995 by 3 percent, as did part-time enrollment of white graduate students (down 7 percent) and foreign graduate students (down 4 percent). (See appendix table 4-23.)

Pursuit of Graduate Study After the Bachelor's

Analysis of data from the National Science Foundation's National Survey of Recent College Graduates reveals that women and men are similar in their pursuit of graduate study after the bachelor's degree. Among 1993 science and engineering bachelor's degree recipients who were surveyed in 1995, 27 percent of women and 25 percent of men had a master's or higher degree or were enrolled full time in 1995. (See text table 4-1.) Although men and women in the aggregate were similar in their pursuit of graduate studies, differences existed within fields. For example, among those with a 1993 bachelor's degree in biological sciences, 41 percent of women, but 49 percent of men, had a master's or higher degree or were enrolled full time in 1995. In physical sciences, women were the more likely to pursue graduate study: 48 percent of women with a 1993 bachelor's degree and 40 percent of men had a master's or higher degree or were enrolled full time in 1995. Among those not pursuing further education, men and women gave, for the most part, similar reasons for not taking courses after graduation, although women were more likely than men to cite financial reasons (53 percent of women compared with 38 percent of men with bachelor's science degrees, and 37 percent of women compared with 30 percent of men with bachelor's engineering degrees). (See text table 4-2.)

Racial/ethnic groups are similar in their pursuit of graduate study after the bachelor's degree, with the exception of Asians. Among 1993 science and engineering bachelor's degree recipients, 34 percent of Asians had a master's or higher degree or were enrolled full time in 1995, compared to 26 percent of the total. (See text table 4-1.)

Persons with disabilities, who represent 2.4 percent of the 1993 bachelor's science and engineering graduates, were less likely than others to pursue graduate education or to be employed. Among 1993 science and engineering bachelor's degree recipients, 76 percent of those with disabilities were not students in 1995, compared to 67 percent of the total. (See text table 4-3.) Recent bachelor's graduates with disabilities were also less likely to be employed—30 percent were not employed in 1995 compared to 16 percent of the total.

Pursuit of Graduate Study After the Bachelor's *(continued)*

Text table 4-1.

Percent of 1993 science and engineering bachelor's degree recipients who have master's or higher degree and/or were enrolled full time, by sex, race/ethnicity, and field of degree: April 1995

Major field	Total recipients	Percentage having master's or higher as of April 1995 or enrolled full time on April 15, 1995							
			Sex		Race/ethnicity				
		All	Male	Female	White, non-Hispanic	Asian or Pacific Islander	Black, non-Hispanic	Hispanic	American Indian/ Alaskan Native
All science and engineering fields	348,900	26	25	27	26	34	25	24	28
Major type									
Total science	290,500	28	28	28	28	36	26	25	31
Total engineering	58,400	18	18	18	15	31	20	17	S
Major field									
Computer and mathematical sciences, total	35,200	14	14	15	14	S	S	S	S
Computer science and information sciences	18,700	6	S	S	S	S	S	S	S
Mathematics and related sciences	16,500	24	26	21	24	S	S	S	S
Life and related sciences, total	58,600	40	43	38	39	50	49	35	S
Agricultural and food sciences	6,200	15	S	25	16	S	S	S	S
Biological sciences	50,000	45	49	41	44	52	50	40	S
Environmental life sciences including forestry sciences	2,500	S	S	S	S	S	S	S	S
Physical and related sciences, total	16,500	42	40	48	40	S	43	S	S
Chemistry, except biochemistry	8,600	50	46	54	47	S	S	S	S
Earth sciences, geology, and oceanography	3,900	26	26	S	25	S	S	S	S
Physics and astronomy	3,900	43	41	S	43	S	S	S	S
Other physical sciences	S	S	S	S	S	S	S	S	S
Social and related sciences, total	180,200	25	25	25	25	30	21	22	29
Economics	21,800	19	17	23	18	S	S	S	S
Political science and related sciences	44,700	33	32	34	35	S	S	S	S
Psychology	65,300	27	28	27	28	S	S	S	50
Sociology and anthropology	28,600	17	19	16	16	S	S	S	S
Other social sciences	19,800	20	21	19	18	S	S	S	S
Engineering, total	58,400	18	18	18	15	31	20	17	S
Aerospace and related engineering	2,300	28	28	S	25	S	S	S	S
Chemical engineering	4,300	18	20	S	13	S	S	S	S
Civil and architectural engineering	8,600	16	16	S	15	S	S	S	S
Electrical, electronic, computer, communications engineering	20,000	16	16	S	14	S	S	S	S
Industrial engineering	3,300	13	S	S	S	S	S	S	S
Mechanical engineering	13,900	15	15	S	12	S	S	S	S
Other engineering	6,100	30	28	S	26	S	S	S	S

KEY: S = Data with weighted values less than 100 or unweighted sample sizes less than 20 are suppressed for reasons of respondent confidentiality and/or data reliability.

NOTE: Details may not add to totals because of rounding. Percents calculated on unrounded data.

SOURCE: National Science Foundation/SRS, National Survey of Recent College Graduates, 1995.

Pursuit of Graduate Study After the Bachelor's (continued)

table 4-2.

Percentage of 1993 science and engineering bachelor's degree recipients who have not taken courses since most recent degree and percent choosing selected reasons for not taking courses, by sex and field of degree: April 1995

Major field	Percentage not taking courses	Reasons for not taking courses: Achieved education goals	Waiting for term to start	Financial reasons	Had job; needed work	Family respon-sibility	Moved	Uncertain as to field	Needed break	Other
All science and engineering fields	57	69	6	43	82	12	10	23	51	5
Total science										
Male	59	69	6	38	82	11	7	20	49	5
Female	54	67	7	53	82	15	11	30	54	5
White, non-Hispanic	57	70	5	44	82	11	9	26	52	5
Black, non-Hispanic	53	45	12	58	84	24	9	17	51	5
Hispanic	54	62	11	44	79	19	11	35	55	6
Asian or Pacific Islander	51	71	15	51	83	14	9	22	44	3
American Indian/Alaskan Native	55	56	S	47	84	21	S	S	36	S
Total engineering										
Male	66	71	4	30	84	11	12	14	50	4
Female	57	64	9	37	83	9	14	29	54	5
White, non-Hispanic	65	72	4	30	84	9	13	15	53	5
Black, non-Hispanic	63	60	S	44	70	22	14	21	45	S
Hispanic	59	56	16	30	93	20	15	10	37	S
Asian or Pacific Islander	58	59	9	33	86	14	8	21	44	3
American Indian/Alaskan Native	58	95	S	S	S	S	S	S	S	S

KEY: S = Data with weighted values less than 100 or unweighted sample sizes less than 20 are suppressed for reasons of respondent confidentiality and/or data reliability.

NOTE: Details will not add to totals because respondents could choose more than one reason for not taking courses. Percents calculated on unrounded data.

SOURCE: National Science Foundation/SRS, National Survey of Recent College Graduates, 1995.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Pursuit of Graduate Study After the Bachelor's (continued)

Text table 4-3.
Enrollment, degree attainment, and employment status for the 1993 science and engineering bachelor's degree recipients: April 1995

Status	Total number	Enrollment status April 15, 1995						Degree attainment April 1995				Employment status April 15, 1995					
		Full-time student		Part-time student		Not student		Attained an MA or higher by April 30,		Not attained an MA or higher by April		Employed full time		Employed part time		Not employed	
		Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Recent Science and Engineering Graduates, total	348,900	82,000	24	34,600	10	232,300	67	11,600	3	337,400	97	250,500	72	42,600	12	55,900	16
Women	162,600	40,600	25	18,500	11	103,500	64	4,700	3	157,900	97	109,900	68	22,900	14	29,800	18
Black, non-Hispanic	19,800	4,500	23	1,900	9	13,400	68	600	3	19,300	97	14,100	71	2,200	11	3,500	18
Hispanic	18,200	4,100	22	1,500	8	12,600	69	500	3	17,700	97	12,500	69	1,900	11	3,800	21
Disabled	8,400	1,100	13	S	S	6,400	76	S	S	8,300	99	4,500	54	1,300	16	2,500	30

KEY: S = Data with weighted values less than 100 or unweighted sample sizes less than 20 are suppressed for reasons of respondent confidentiality and/or data reliablilty.

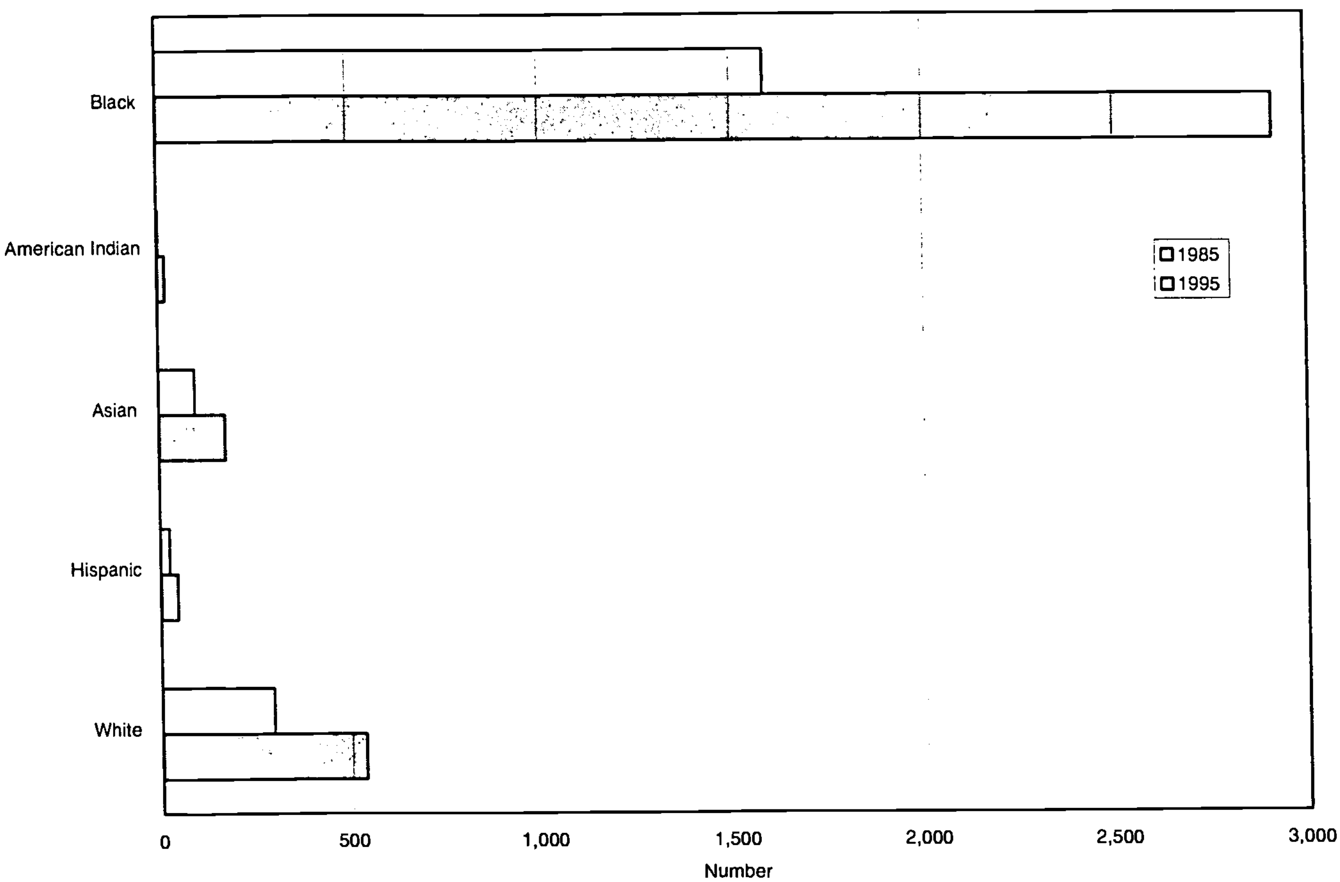
NOTE: Details may not add to totals because of rounding. Percents calculated on unrounded data.

SOURCE: National Science Foundation/SRS, National Survey of Recent College Graduates, 1995.

Historically Black Colleges and Universities

There were 3,834 U.S. citizen and permanent resident graduate science and engineering students enrolled in Historically Black Colleges and Universities (HBCUs) in this country in 1995, up 72 percent between 1985 and 1995. In 1995, black students were the largest portion of enrollment at 76 percent; American Indian students, 1 percent; Asian students, 5 percent; Hispanic students, 2 percent; and white students, 14 percent. (See figure 4-10.) Within HBCUs in 1995, black student enrollment was concentrated in social sciences (32 percent), American Indian students in physical sciences (79 percent), Asian students in mathematical sciences (29 percent), Hispanic students in physical sciences and biological sciences (both 20 percent), and white students in psychology (26 percent). (See appendix table 4-24.)

Figure 4-10.
Science and engineering graduate students attending HBCUs: 1985 and 1995



See appendix table 4-24.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Persons With Disabilities

About 3 percent of graduate students studying in all fields, science and engineering as well as non–science-and-engineering fields, reported a disability in 1996. (See appendix table 4-25.) Students with disabilities were more likely to be enrolled in health fields than students without disabilities, and were less likely enrolled in life and physical sciences and in en-ing/computer science/mathematics fields.

Outcomes: Master's Degrees and Doctorates in Science and Engineering

Overview

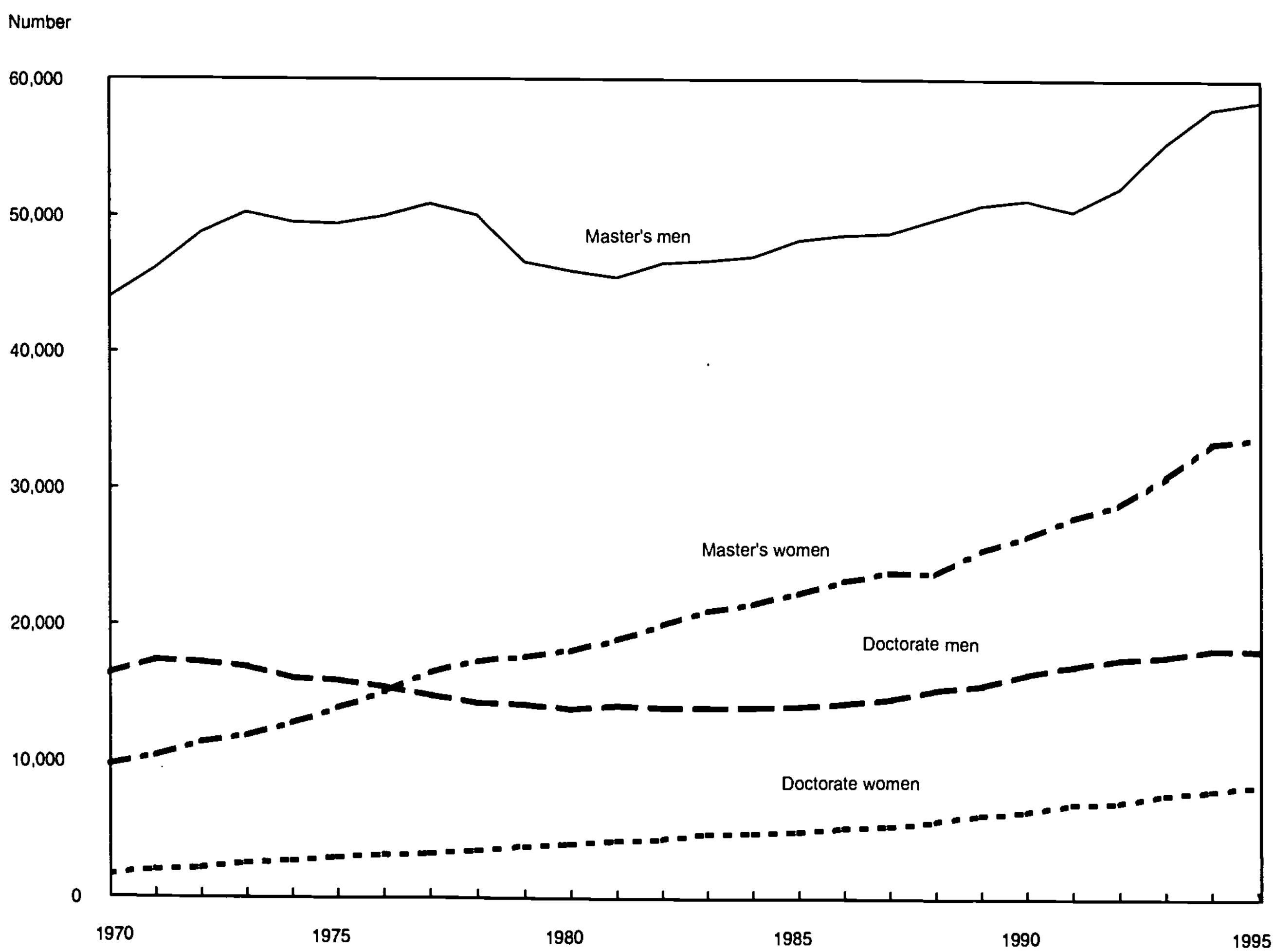
Degrees marking the formal outcomes of graduate education are important credentials for those pursuing science and engineering careers. Data on these outcomes

provide benchmarks for measuring the progress of women and various racial/ethnic population groups in increasing their representation.

Graduate education has expanded significantly during the almost three decades between 1966 and 1995. The overall expansion in degrees awarded encompasses an uneven pattern of growth, however. For about 10 years, from the mid-1960s until the mid-1970s, growth was sustained and rapid; for approximately the next 10 years, increases in total degrees and in science and engineering degrees were much slower. The slowdown in science and engineering degrees, however, was almost exclusively caused by a decline until the early 1980s in the number of men earning these degrees.

The number of female science and engineering doctoral degree recipients increased in every year since 1966, and the number of female science and engineering master's degree recipients increased in every year but one. (See appendix tables 4-26, 4-27, and 4-28.) The pattern was different for men. After increasing from the outset, the number of master's degrees in science and engineering awarded to men decreased between 1974 and 1981 in all but 2 years. The number of master's degrees then began a period of growth so gradual that it took until 1990 to surpass the number of degrees awarded in any year during the 1970s. The pattern was similar but even more pronounced for male doctorate recipients in science and engineering. The number of degrees awarded decreased every year between 1972 and 1980. Following that decline it took until 1992 for the number of science and engineering doctorates awarded to men again to reach the total achieved in 1971. (See figure 4-11.)

Figure 4-11.
Total science and engineering master's and doctorate recipients by sex: 1970–1995



See appendix table 4-27.

Notwithstanding the increased participation of women over the last three decades, traditionally more men than women have participated in advanced graduate education. As a result, in general the more advanced the degree, the lower the proportion of female degree recipients. For example, the proportion of the degrees awarded to women in both science and engineering fields and non–science-and-engineering fields was higher at the master's level than for the doctorate. The same pattern holds true for science and engineering degrees at the bachelor's/master's level: women as a percentage of all degree recipients was higher at the bachelor's degree level than at the master's degree level. Since 1988, however, that pattern has reversed for non–science-and-engineering degrees: women received a higher proportion of total master's degrees in non–science-and-engineering fields than the proportion they received for bachelor's degrees. (See appendix tables 4-26, 4-27, and 4-28.)

Women

Master's Degrees

Women have constituted at least half of all master's degree recipients since 1986. They have made great strides in their participation in science and engineering master's degrees over the last 10 years (although they continue to receive fewer science and engineering degrees than men). Women's science and engineering master's degrees increased by 60 percent over the 10-year period between 1985 and 1995. Their 35,791 degrees awarded in 1995 were 38 percent of the total science and engineering degrees in that year, up from 22,331, or 32 percent of the total, in 1985. In contrast, since 1975 women have received the majority of all non–science-and-engineering master's degrees. They received 60 percent of the total non–science-and-engineering master's degrees in 1995, up from 56 percent of the total 10 years earlier. Women received a higher *number* of non–science-and-engineering degrees throughout this period, but the increase was at a slower *rate* than for those in science and engineering—52 percent, from 121,166 in 1985 to 184,439 in 1995. (See appendix table 4-29.)

Science Master's Degrees

The number of master's degrees awarded to women in all sciences increased 55 percent over the 10-year period between 1985 and 1995. This increase exceeded the 35 percent increase in natural sciences,[4] in which the numbers increased from 7,731 in 1985 to 10,428 in 1995. (The greater increase in all sciences combined was due to larger increases in the number of women in psychology and the social science fields.) (See appendix table 4-29.)

Natural Sciences

Women as a proportion of all natural science master's degree recipients rose from 32 percent of the total in 1985 to 36 percent in 1995. The total number of recipients of degrees in earth, atmospheric, and ocean sciences decreased for both men and women over the 10-year period, but the decrease was faster for men (27 percent fewer degrees, to 994 in 1995) than for women (13 percent fewer, to 451 in 1995). Mathematics and computer sciences were the only fields in which women had a smaller share of the total master's degrees in 1995 than they did in 1985, although the change was minimal: their proportion of degrees awarded decreased from 31 to 30 percent of the total number in those fields. This decrease in *proportion* came despite an increase in absolute *numbers* (from 3,053 in 1985 to 4,365 in 1995). Thus, although an increased number of women were interested in pursuing master's degrees in mathematics and computer science, these disciplines continued to be even more attractive to men.

Psychology and the Social Sciences

Women increased their proportion of total master's degrees in psychology, rising from 63 percent of total master's degrees awarded in that field in 1985 (5,417) to 72 percent of the total in 1995 (9,397). Social sciences degrees awarded to women also increased over the 10-year period, from 6,939 in 1985 to 11,334 in 1995 (representing an increase from 40 to 49 percent in the proportion of the total social science degrees awarded to females in 1985 and 1995).

Engineering Master's Degrees

The largest percentage increase in master's degrees awarded to women was in engineering (a 106 percent increase over the 1985–1995 period), although women constituted a smaller percentage of degrees in engineering than in any other major field (16 percent of total master's degrees in 1995). Nevertheless, the number of women receiving engineering master's degrees more than doubled in the 10-year period, from 2,244 in 1985 to 4,632 in 1995. (The numbers of men receiving master's degrees in engineering, although still in the majority, increased only 28 percent in numbers over the same 10-year period, from 18,728 in 1985 to 23,998 in 1995.)

[4] The social sciences and psychology are excluded from the tabulation of natural sciences, but are included in the tabulation of all sciences.

Doctoral Degrees

Doctoral Degrees in All Fields

In both science and engineering and non–science-and-engineering fields, the proportion of degrees awarded to women in 1995 was lower for the doctorate than for the master's degree. (See figure 4-12.) The increase since 1985 in the number of doctoral degrees awarded in every major field was, however, higher for women than for men. As a result, women increased their proportionate share of all doctoral degrees over the 10-year period. (See figure 4-13.)

The total number of doctorates awarded in all fields increased by 33 percent since 1985 (see appendix table 4-30), but the increase for women was faster—52 percent over the same time period. Women received 16,333 doctoral degrees in 1995, 39 percent of the doctorates awarded; this was up from 34 percent of the total in 1985. (See appendix table 4-31.) Women have earned the majority of non–science-and-engineering doctoral degrees since 1989. The *proportion* of the non–science-and-engineering degrees awarded to women increased from 47 percent in 1985 to 53 percent in 1995. The 8,060 female doctorate recipients in the non–science-and-engineering fields were particularly concentrated in education, where they received 62 percent of the education doctorates in 1995, and in health degrees,[5] where 63 percent of the degrees were awarded to women. (See appendix table 4-32.)

Doctoral Degrees in Science and Engineering

Interestingly, although women make up a greater percentage of non–science-and-engineering doctorate recipients, since 1993 women have received more science and engineering doctoral degrees than non–science-and-engineering doctoral degrees. The number of science and engineering doctoral degrees awarded to women increased faster than the increase in non–science-and-engineering degrees—69 percent versus 38 percent over the 10-year period. The *proportion* of total science and engineering doctoral degrees that were awarded to women increased from 26 percent of total science and engineering degrees in 1985 to 31 percent in 1995. (See appendix table 4-32.)

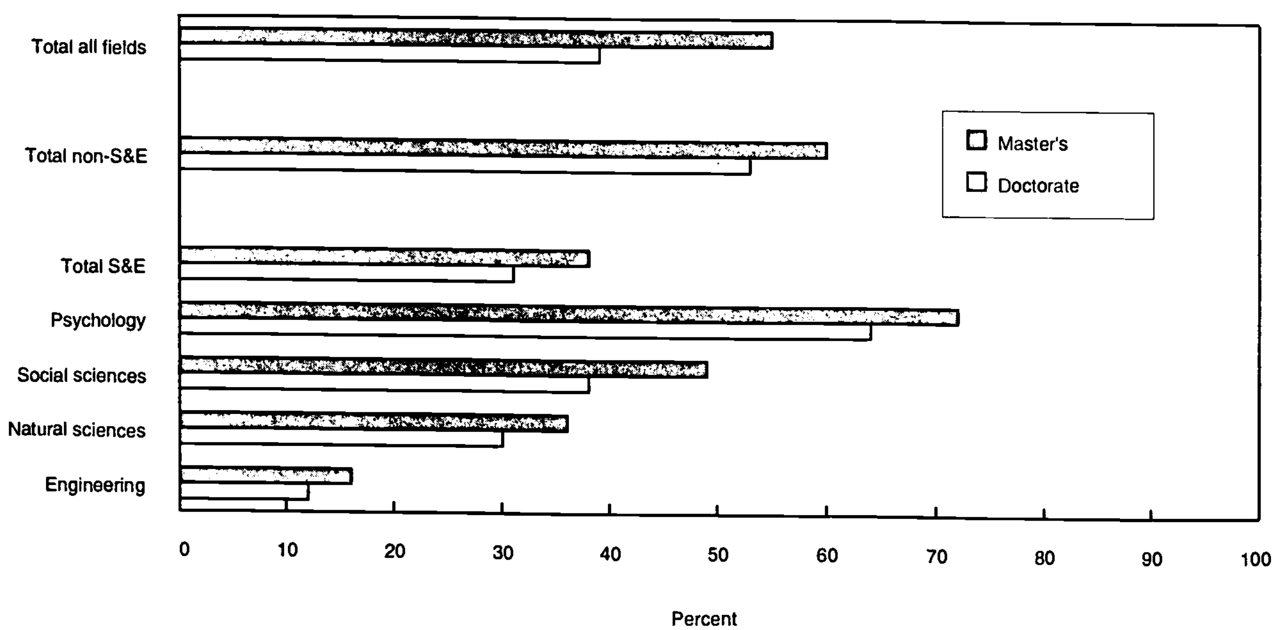
Science Doctoral Degrees

Psychology and the Social Sciences

Psychology was the only science and engineering field in which women received more doctorates than

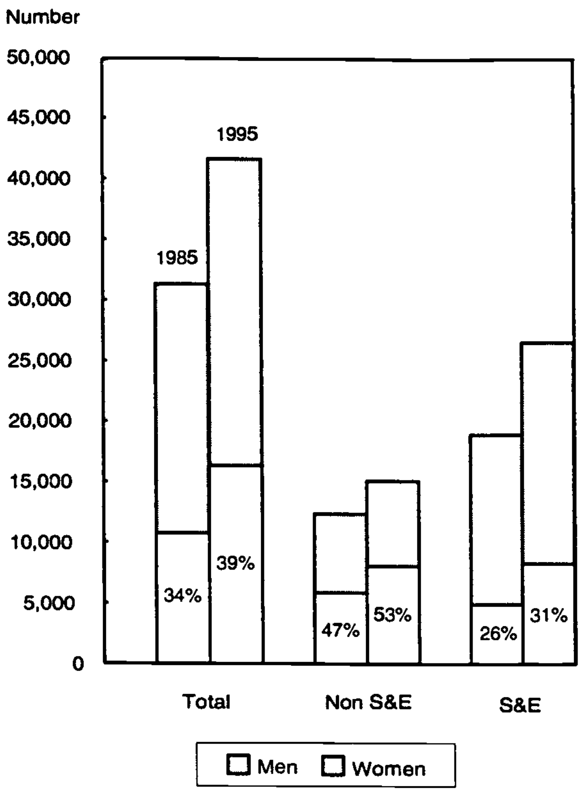
[5] Health fields include such fields as nursing, pharmacy, veterinary medicine, public health, and epidemiology.

Figure 4-12.
Women as a percent of master's and doctorate recipients, by major field: 1995



See appendix tables 4-26 to 4-28.

Figure 4-13.
Total doctoral degrees awarded and percentage received by women: 1985 and 1995



See appendix tables 4-26 to 4-28.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

men. Of all doctoral degrees awarded in psychology, the proportion awarded to women rose from 51 percent in 1985 to 64 percent in 1995. Women received 38 percent of the social science degrees overall in 1995, but their participation within the *subfields* of the major field of social science was not even. For example, although women received 24 percent of the economics degrees, they received 58 percent of all the anthropology doctoral degrees and 53 percent of the sociology degrees. (See appendix table 4-31 for a detailed breakdown by major field and subfield of women's participation in doctoral degrees.)

Natural Sciences

Women received 30 percent of the doctorates in the natural sciences in 1995. Within that category they received 41 percent of the biology degrees and 23 percent of total physical sciences degrees. Physical sciences included 31 percent of the chemistry degrees and 17 percent of the astronomy degrees but only 12 percent of the physics doctoral degrees awarded in 1995. Women earned 22 percent of three other natural science disciplines: earth, atmospheric, and ocean sciences; mathematics; and agricultural sciences. They received 19 percent of the computer science degrees. (See figure 4-14.)

Engineering Doctoral Degrees

The smallest proportion of women doctorate recipients in any broad field was in engineering. Men earned 5,313 engineering doctoral degrees in 1995 whereas women earned 694 engineering degrees, just 12 percent of the total engineering doctorates. This figure represented a sizable increase over the 10-year period, however; women had earned only 7 percent of the engineering doctorates in 1985. The distribution of women is not equal within the various engineering subfields. The highest absolute number of engineering doctorates awarded to women in 1995 was in electrical engineering (173), but women constituted only 10 percent of the total 1,731 degrees conferred. The next highest number of female doctorates in engineering was in chemical engineering (109), but they represented only 15 percent of the total 708 chemical engineering degrees awarded in 1995.

Proportionately the highest concentration of women in engineering was in those subfields that were related in some way with health matters; nevertheless, even in these subfields the number of women was also very small. For example, women constituted 25 percent of the doctorate recipients in bioengineering/biomedical engineering, but the total was only 48 women. Similarly, 25 percent of environmental health engineering doctorates were awarded to women, but the absolute number receiving those degrees was even smaller—21 women doctorates. (See appendix table 4-32.)

The Top 50 Institutions Granting Science and Engineering Doctorates to Women

The top 50 institutions, ranked by the number of science and engineering doctorates earned by women, awarded 52 percent (4,308) of all the science and engineering doctorates awarded to women in 1995 (8,273). Women received the majority of doctorates in only two of those institutions, however.[6] Overall, women received 30 percent of the doctoral degrees awarded by these institutions in 1995. They received 35 percent of the science doctoral degrees at these institutions, much higher than the proportion of engineering doctorates they received at the same institutions (12 percent). (See appendix table 4-33.)

[6] The California School of Professional Psychology at Los Angeles and at San Diego.

Financial Support for the Training of Women Doctorate Recipients

External financial support during doctoral study is often crucial for completion of the degree; few students and/or their families can pay all the bills on their own. Because it is important to track the sources of support for doctorate recipients, each year a question on the Survey of Earned Doctorates asks doctorate recipients to list the source of their *primary* means of support. In 1995, about half of the women (49 percent) reported that they were supported by university-administered support mechanisms (teaching and research assistantships,[7] and fellowships and traineeships). The other half (51 percent) were supported through "other" means. "Other" mechanisms include self-, family-, or industry-financed costs or loans.[8] (See appendix table 4-34.)

University-Administered Means of Support

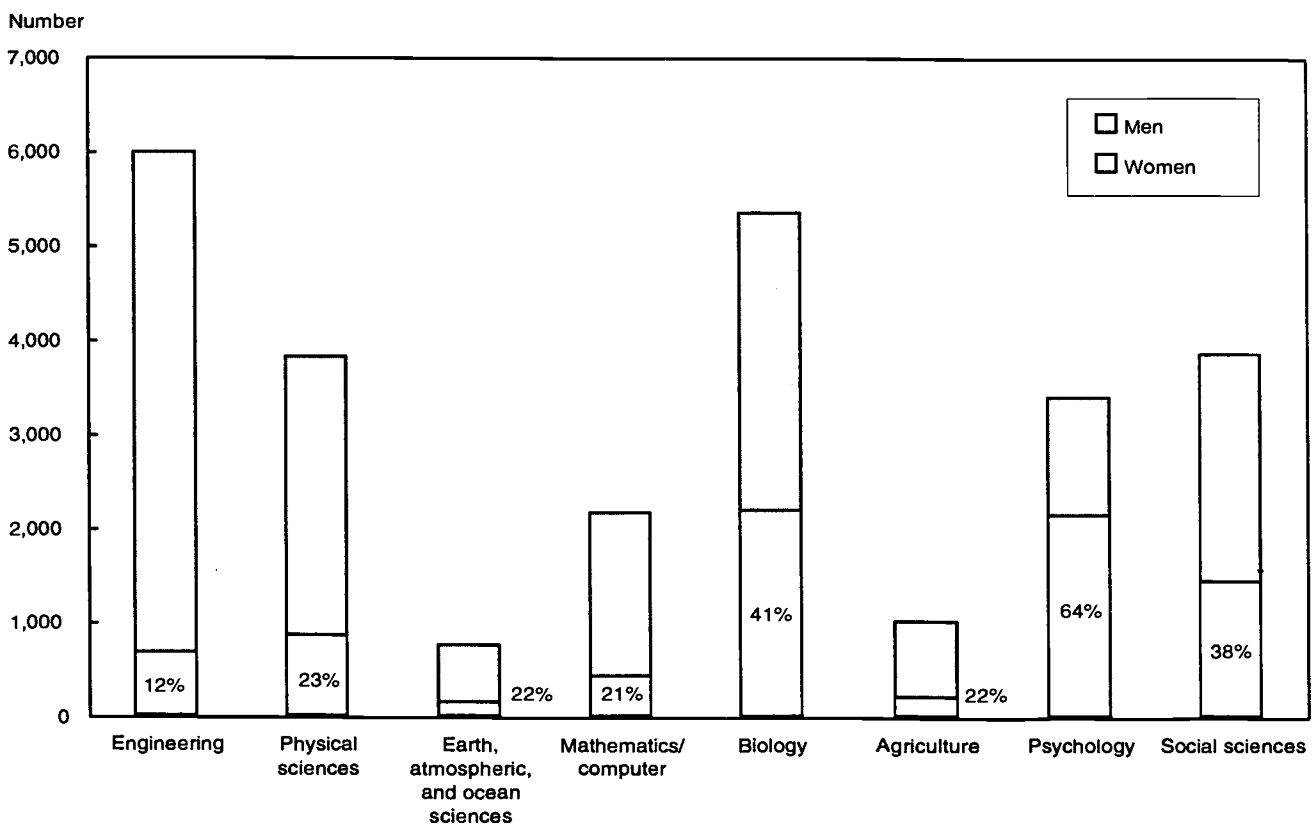
More doctoral recipients were supported by research assistantships than by any other university-administered mode of support: 32 percent of all men and 25 percent of all women. The second highest category of university-administered support mechanisms was teaching assistantships: 13 percent of women and 14 percent of men received this form of support as their primary source of money throughout the doctoral degree process. In addition, 11 percent of women and 8 percent of men received traineeships or fellowships as their primary means of support.

In general, the proportion of each sex receiving these modes of support was roughly even with the proportion

[7] Because a respondent to the survey may not know the true source of research assistantship support, all research assistantships are classified here as being university-administered. The Federal government or State governments may have been the primary source for the funds for some of these assistantships, however.

[8] The tabulation of this "other" category also included those who did not answer the question.

Figure 4-14.
Number of science and engineering doctoral degrees awarded and percentage received by women: 1995



See appendix table 4-31.

of each sex who received doctoral degrees. For example, women constituted 31 percent of the science and engineering doctorates in 1995, and they received 26 percent of the research assistantships and 30 percent of the teaching fellowships. They earned slightly more than their proportional share of all fellowships and traineeships (40 percent).

In three fields—physical sciences, engineering, and biology—over 60 percent of the women doctorate recipients received their primary support from one of the four university-administered methods, rather than their own resources or other support mechanisms. In contrast, psychology and social sciences had the lowest proportion of women receiving one of the four university-administered methods of support.

Baccalaureate Origin Institutions

Large universities enroll the greatest number of undergraduate students and, therefore, would be expected to be the baccalaureate origin of the majority of students who go on to earn higher degrees, but liberal arts colleges in general, and women's liberal arts colleges in particular, also play an important role in the education of women receiving bachelor's degrees who continue their education and subsequently earn doctorates in science and engineering.

The list of the 50 baccalaureate-granting institutions that awarded the greatest number of baccalaureate degrees to women who subsequently earned science and engineering doctorates between 1991 and 1995 is shown in appendix table 4-35.[9] The list includes liberal arts colleges and women's colleges as well as large universities. These 50 academic institutions were particularly strong in the science and engineering preparation of women undergraduates. In 39 of those 50 baccalaureate-origin institutions, of all the female graduate students who went on to receive a doctorate degree of any kind, a majority earned those doctorates in science and engineering fields. It is interesting to note that the remaining 11 baccalaureate-origin institutions were all universities; that is, of those institutions in which the majority of female undergraduates who went on to receive a doctorate degree received those doctorates in non–science-and-engineering fields, none were liberal arts colleges or women's liberal arts colleges.

[9] For corresponding data for racial/ethnic minority groups, see "Undergraduate Origins of Recent (1991–1995) Science and Engineering Doctorate Recipients" (NSF 96-334). Also, see tables 12, 14a, 14b, 14c, and 15.

Psychology—which had the highest percentage of women recipients—had the highest percentage supported by "other" sources: just 28 percent of the female doctorates (and 31 percent of the male doctorates) reported one of the listed four university-administered mechanisms as their primary means of support.

It is through research assistantships that many students are able to enter into mentoring situations, and research assistantships are often an opportunity to participate in complex cutting-edge research. Obtaining a research assistantship is thus a very helpful early step leading to a future research career. For this reason research assistantships are carefully monitored by academic policymakers. The highest percentage of research assistantships offered in any field was in the physical sciences: 44 percent of the 1995 doctorate recipients in this field received their primary means of support from research assistantships. Forty-two percent of the women doctorate recipients and 44 percent of the men cited this method as their primary support. Next highest in proportion offering research assistantships was engineering. Forty-seven percent of all the women engineering doctorate recipients mentioned this as their primary mode of support (versus 42 percent of the men). In contrast, only 11 percent of women psychology recipients (and 12 percent of men) reported receiving research assistantships as their primary means of support. Social sciences had the smallest percentage receiving research assistantships—11 percent of both women and men.

Postgraduation Plans

With few exceptions, the postgraduation plans of women and men science and engineering doctorate recipients who were U.S. citizens and permanent residents were remarkably similar in proportion—63 percent of the women and 62 percent of the men had definite postgraduation plans at the time of graduation. Roughly one-quarter of the doctoral recipients planned postdoctoral study (27 percent of the women and 25 percent of the men). Seventeen percent of the women planned academic employment, and 13 percent of the men had those plans. The percentage going into industry was nearly twice as high for the men as for the women, however: 14 percent of men planned industrial employment versus 8 percent for women. (See appendix table 4-36.)

In 1995, women constituted 36 percent of the doctorate recipients who were U.S. citizens and permanent residents, and they constituted 37 percent of the doctorate recipients who had firm postgraduation plans. The percentages for their participation in each of the postgraduation options were generally close to their proportionate sizes with two exceptions: women were planning only 25 percent of all the entrances into industry for

science and engineering doctorates, and they constituted just 26 percent of all those planning employment abroad. (See appendix table 4-36.)

Forty-three percent of the science and engineering doctorate recipients entering academic employment in 1995 were women, higher than their overall percentage of 36 percent of the science and engineering doctorates. These percentages of postgraduation plans parallel overall employment data taken from the 1995 Survey of Doctorate Recipients, in which 46 percent of instructor/lecturers were women. (The proportion of women decreases as the faculty rank gets higher. In 1995, for example, women constituted only 15 percent of tenured faculty. They made up 24 percent of faculty who were associate professors and 11 percent of the faculty who were full professor appointments.[10])

Minorities

Master's Degrees

Master's Degrees to Nonresident Aliens Versus U.S. Citizens and Permanent Residents

In 1995, 399,428 master's degrees were awarded in the United States; 88,431, or 22 percent, were in science and engineering fields. (See appendix table 4-37.) The pattern of science and engineering degrees awarded to nonresident aliens was different from the pattern for U.S. citizens and permanent residents: nonresidents had a higher concentration in science and engineering fields. They received 12 percent of the total master's degrees in 1995, but 24 percent of the master's degrees in science and engineering fields.

The field with the highest concentration of nonresident aliens was computer science, in which they received 38 percent of total master's degrees, up from 24 percent in 1987. The second highest concentration was in engineering, where nonresidents received 34 percent of the total master's degrees awarded in 1995 (up from 26 percent in 1987).

Master's Degrees to U.S. Citizens and Permanent Residents[11]

In contrast, the bulk of master's degrees awarded to U.S. citizens and permanent residents were in non–science-and-engineering fields; just 19 percent of the total, or 67,110, were awarded in science and engineering fields. (See appendix table 4-37.) Since 1987 the increase in non–science-and-engineering degrees awarded (34 percent over the 8-year period) was more rapid than the increase in science and engineering fields (25 percent during the same time span).

Master's Degrees by Racial/Ethnic Group

In 1995, whites earned the highest number of master's degrees in both science and engineering fields and non–science-and-engineering fields. Asians earned the next largest number of science and engineering degrees, followed in order by blacks, Hispanics, and American Indians. (See appendix table 4-37.) That hierarchy has not changed over the 8-year period since 1987, but there have been changes in many fields in the proportion of the total held by each racial/ethnic group.

The largest change was in computer science. Whites and American Indians experienced decreases since 1987 in the number of computer science degrees earned. Whites had an 11 percent drop in degrees from 4,717 in 1987 to 4,205 in 1995. American Indians experienced a 27 percent decrease in degrees (although the number was small—from 22 recipients in 1987 to 16 in 1995). All the other racial/ethnic groups increased the number of their recipients of computer science degrees: blacks (from 207 to 347, a 68 percent increase), Hispanics (from 123 to 198, a 61 percent increase), and Asians (from 779 to 1,239, a 59 percent increase). Asians increased their *proportion* of computer science degrees the most—from 12 percent of total degrees in 1987 to 19 percent in 1995).

With the exception of the decrease for American Indians in computer sciences and a 3 percent decline in the number of biological science master's degrees for blacks, every minority group had an increase in both the percentage of degrees awarded and the number of total master's degrees awarded in every field between 1987 and 1995. As a consequence, there was a decrease in the *percentage* of total degrees awarded to whites in every field. There was also a decrease in the *number* of degrees they received in computer science, physical sciences, and biological sciences. The actual number of degrees awarded to whites increased in all other fields.

Women Master's Degree Recipients by Racial/Ethnic Group

Women as a Percentage of Each Racial/Ethnic Group

Women who were members of underrepresented minority groups received a higher proportion of total science and engineering master's degrees awarded to

[10] There are many reasons for the smaller proportion of women in the higher academic faculty posts. See discussion of academic employment in chapter 5.

[11] Beginning in 1987, there was a change in the way racial/ethnic questions were asked of master's degree recipients; therefore no consistent comparisons can be made with data earlier than 1987. The discussion of master's trend data by race/ethnicity of recipients includes only the period between 1987 and 1995. (A full 10-year trend was presented above for all doctorate data and for master's degree data by sex of recipients.)

their respective racial/ethnic group than did either white women or Asian women. Black women were the only women in any racial/ethnic group to earn a majority of science and engineering master's degrees—in 1995, they earned 54 percent of those master's degrees awarded to blacks. American Indian women had the next highest proportion, 49 percent of all science and engineering master's degrees awarded to American Indians. Hispanic women earned 44 percent of all science and engineering degrees awarded to Hispanics. Whites and Asians—the two groups that had the highest proportion of total degrees in science and engineering—had the lowest proportion of female science and engineering master's degree recipients. White women earned 41 percent of all science and engineering master's degrees awarded to whites, and Asian women earned just 34 percent of science and engineering master's degrees earned by Asians.

Black women earned 30 percent of all the engineering master's degrees awarded to blacks—the highest proportion of engineering degrees of all the female racial/ethnic groups. Asian women were the next highest, earning 21 percent of engineering degrees awarded to Asians. Hispanic women were third highest with 19 percent. White women earned 16 percent of the total number of engineering master's degrees awarded to whites. American Indian women earned by far the smallest proportion of engineering degrees for a racial/ethnic group—only 7 percent of engineering master's degrees awarded to American Indians were awarded to females. (See appendix table 4-38.)

Women in Racial/Ethnic Groups as a Percentage of All Women Science and Engineering Degree Recipients

White women earned 77 percent of all the science and engineering master's degrees awarded to women. Their proportion of the total in each field was generally close to their proportion in the overall female population for most disciplines except for computer science, where they constituted only 56 percent of all women master's recipients. (See appendix table 4-38.)

Asian women represented approximately 7 percent of all female master's degree recipients in science and engineering, but 27 percent of the computer science degrees and 17 percent of the engineering degrees awarded to women. Proportionately more Asian women received computer science degrees than other degrees—23 percent of all Asian women earned their science and engineering master's degrees in computer science.

Women in the underrepresented minority groups received their science and engineering master's degrees in various fields in approximate proportion to their representation in the total: blacks (7 percent), Hispanics (4 percent), and American Indians (less than 1 percent).

Doctoral Degrees

Doctoral Degrees to Nonresident Aliens Versus U.S. Citizens and Permanent Residents

It is important to note that (similar to master's degrees) there was also a difference to the pattern of doctoral degrees awarded to nonresident aliens versus those awarded to U.S. citizens and permanent residents. The total number of doctoral degrees awarded to nonresident aliens increased by 68 percent between 1985 and 1995 (from 5,227 to 8,806); this increase was higher than the 29 percent rise in doctorates awarded to U.S. citizens and permanent residents over the same 10-year period (from 24,694 in 1985 to 31,910 in 1995). As a result, nonresident aliens constituted 21 percent of total doctorate recipients in 1995, up from 17 percent in 1985. These individuals are very interested in pursuing doctoral degrees in science and engineering. Seventy-nine percent of the nonresident aliens acquiring doctoral degrees in the United States in 1995 chose science and engineering fields. This percentage was much higher than the science and engineering proportion of total degrees awarded to U.S. citizens and permanent residents—59 percent. (See figure 4-15.) Twenty-nine percent of the nonresident aliens awarded doctoral degrees received their degrees in engineering versus 10 percent of the doctorate recipients who were U.S. citizens and permanent residents.

Nonresident aliens received 21 percent of doctoral degrees overall, but 42 percent of all the engineering doctoral degrees awarded in 1995 and 25 percent of the natural science degrees. They received only 5 percent of the psychology degrees, 12 percent of social science degrees, and 12 percent of the non–science-and-engineering degrees.

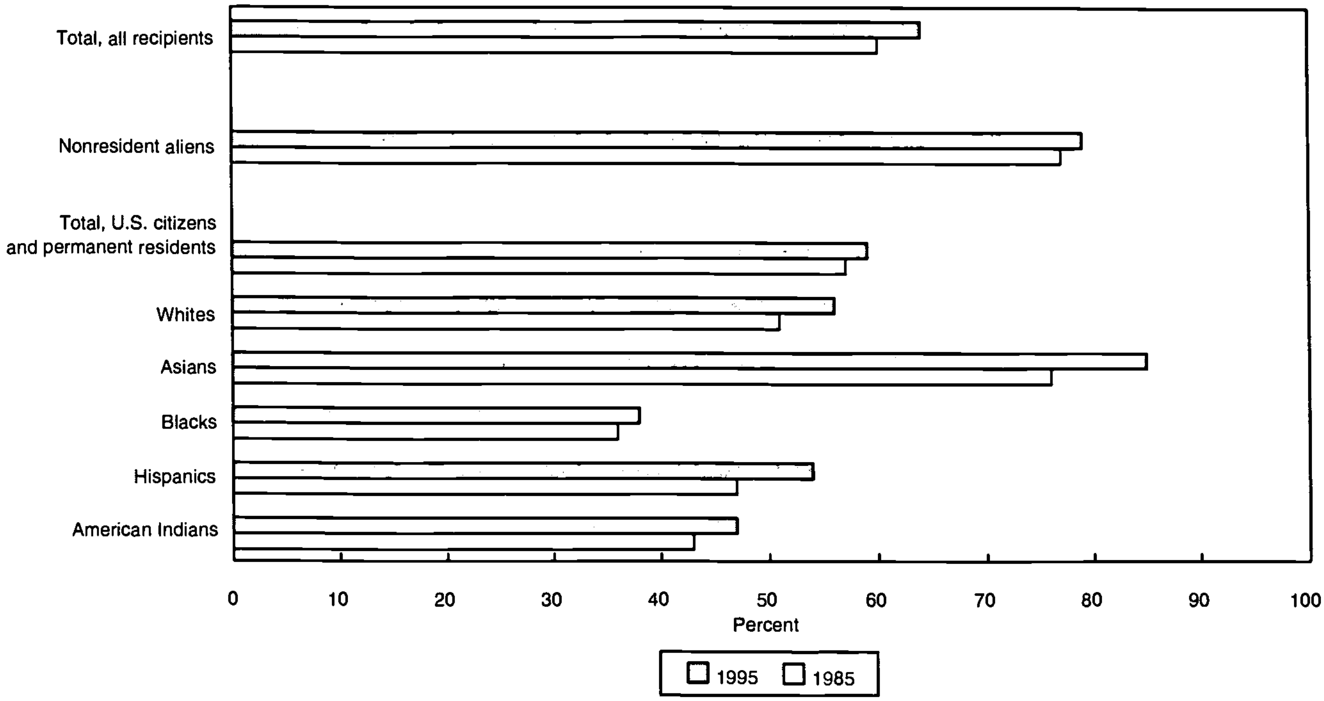
Doctoral Degrees Awarded to U.S. Citizens and Permanent Residents by Racial/Ethnic Group[12]

Doctoral Degrees in All Fields

All racial/ethnic groups enjoyed an increase in the total number of doctoral degrees between 1985 and 1995. Although the percentage increases were very

[12] The data in this section are taken from the annual Survey of Earned Doctorates. In discussing the changes in achievement by the various ethnic groups within the U.S. citizens and permanent residents group, it must be noted that some degree recipients did not fill in the racial/ethnic question on the survey. The number of these recipients, labeled "U.S. citizens and permanent residents—race/ethnicity unknown" decreased by two-fifths between 1985 and 1995, from 376 to 222. This decrease reflects an apparent increase in the willingness of doctorate recipients to report their race/ethnicity. It is not known what proportion of the previously unreported category now is reflected in each of the various racial/ethnic groups; therefore, some of the increases described in this section may also reflect the more accurate reporting patterns of the doctorate recipients. Nevertheless, there was an increase in science and engineering degrees awarded to every racial/ethnic group between 1985 and 1995.

Figure 4-15.
Science and engineering degrees as a percentage of total doctoral degrees awarded, by racial/ethnic group: 1985 and 1995



See appendix table 4-30.

Women, Minorities, and Persons With Disabilities in Science and Engineering:1998

different, Asians had the largest percentage growth of all the racial/ethnic groups—their total degrees awarded increased fourfold, from 1,070 in 1985 to 4,300 in 1995. (See appendix table 4-30.) The increases in doctorate recipients for each one of the underrepresented minority groups were higher than the increase for whites, but none of those increases matched the rate of increase in Asian degree recipients. Of the underrepresented minorities, blacks received the highest number of doctoral degrees overall. In 1995 they received 1,455 doctoral degrees, a 40 percent increase over the 1,043 doctoral degrees awarded to blacks in 1985. Blacks accounted for approximately 3 percent of total doctoral degrees awarded in 1995 and 5 percent of the degrees awarded to U.S. citizens and permanent residents. (See appendix table 4-30.)

Hispanics received 1,055 doctoral degrees in 1995, a 66 percent increase over the 634 received in 1985. Similar to the overall proportion of doctorate recipients for blacks, Hispanics also accounted for approximately 3 percent of total doctoral degrees awarded and 5 percent of degrees awarded to U.S. citizens and permanent residents. (See appendix table 4-30.)

American Indians received 148 doctoral degrees in 1995, a 54 percent increase over the 96 degrees received in 1985. American Indians made up lessthan 1 percent of both total doctoral degrees and doctoral degrees awarded to U.S. citizens and permanent residents.

Doctoral Degrees in Science and Engineering

As with total doctoral degrees, there was a general increase in the popularity of science and engineering degrees in the decade since 1985, but the increase was not uniform among the various racial/ethnic groups. All minority racial/ethnic groups had a greater percentage increase in science and engineering doctoral degrees than whites. Although whites received the highest number of doctoral degrees in both 1985 and 1995 (21,306 and 24,608, respectively), they experienced the smallest percentage increase of any racial/ethnic group over the 10-year period (16 percent). (See appendix table 4-39 for 10-year trends by detailed field.)

In both 1985 and in 1995, Asians received the second highest number of science and engineering doctoral degrees awarded to any racial/ethnic group. but the number of those degrees awarded to Asians increased 353 percent during that time period, from 809 degrees in 1985 to 3,666 in 1995. As shown in appendix table 4-39, the largest increase in Asian doc-

Latino Experiences in Graduate Education

In a study supported by the Council of Graduate Schools and funded by the Ford Foundation, cultural anthropologist Robert A. Ibarra (1996) sought to uncover some of the reasons why the presence of Latinos[13] in graduate school or academia is not proportionate to their numbers in the general U.S. population. This qualitative ethnographic study involved 77 semistructured interviews with samples drawn from Latino faculty, administrators, and graduate students working on master's or doctoral degrees. The interviews elicited personal insights into the graduate school experience. Ibarra reported that Latinos were not a homogeneous group, but that there were differences among Mexican Americans, Puerto Ricans, Cuban Americans, and other Latinos relating to ethnic, socioeconomic, and educational backgrounds. He found, however, that those had less impact than the hidden ethnic conflicts between Latinos and the graduate education process. Latinos, like almost all graduate students, had problems adjusting to a new academic community and facing the rigors of graduate work. In this study, Ibarra found that the difficulties for Latinos in adjusting to graduate school were characterized by *academic cultural shock, ethnic renewal or recognition, and survival.*

Academic Culture Shock

Many respondents mentioned the difficulty of adjusting to an academic culture that was basically competitive rather than the cooperative culture to which they were accustomed.

Ethnic Renewal or Recognition

Ibarra reported that adjustments to graduate school in many cases differed by ethnic group. For instance, some had the experience of becoming aware of one's "minority status" for the first time. This experience was encountered more frequently by island Puerto Ricans, Cubans, and other Latinos. Others found that they experienced an "identity journey" in which the graduate experience was instrumental in defining their identity (Ibarra, 1996, pp. 38, 39).

Survival

Survival experiences, reported Ibarra, were coping strategies common to all underrepresented populations in higher education and were defined as defense mechanisms designed to surmount perceived cultural or academic deficiencies. For some Latinos, coping strategies ranged from aggression and overwork to withdrawal and self doubt. For still others, "survival issues included learning when to speak out and how to define their mission as cultural brokers within an alien environment" (Ibarra, 1996, p. 42).

Ibarra reported that these Latino adjustments to graduate school "occurred in various ways depending upon circumstances...[E]thnic-specific issues became masked by assumptions that most Latino behaviors are identical regardless of ethnic differences. Ethnic renewal and minority recognition, for example, had different implications for Mexican Americans...than for Puerto Ricans or Cubans. Differences relating to immigrant-like experiences were detected even between mainland and island Puerto Ricans. Yet rarely are such distinctions recognized, let alone incorporated into graduate programs" (Ibarra, 1996, p. 43).

Ibarra also reported that according to his respondents, "three factors were considered critical for completing a degree successfully: faculty mentorship, consistent financial support, and student support groups. Without these many respondents admitted they would not have attended or completed their degrees" (Ibarra, 1996, p. 64).

[13] Ibarra used the Spanish term "Latino" in the study, referring to "people representing a superset of nationalities originating from, or having a heritage related to, Latin America." He found that most participants in his study preferred "Latino" over "Hispanic" as a pan-national identifier.

torate recipients occurred since 1993.[14] Degrees awarded to Asians were heavily concentrated in science and engineering. Eighty-five percent of the doctoral degrees awarded to Asians in 1995 were in these fields, up from 76 percent in 1985; this percentage increase was the largest in science and engineering participation exhibited by any racial/ethnic group. Asians were particularly heavily concentrated in engineering: they earned 17 percent of the total of all engineering doctorates and 31 percent of the engineering doctorates that were awarded to U.S. citizens and permanent residents. Twenty-four percent of all Asian doctoral degrees in 1995 were in engineering, by far the highest concentration in that field of any racial/ethnic group. An additional 51 percent of their total degrees were in the natural sciences.

[14] For example, science and engineering degrees earned by Asians doubled in the 8 years between 1985 and 1993 but then jumped by an additional 127 percent in the 2 years between 1993 and 1995. A large part of this rapid rise was due to a change in citizenship status of Chinese students in the aftermath of the Tiananmen Square massacre in 1989. The Chinese Student Protection Act of 1992 made thousands of Chinese in the United States eligible to apply for permanent residency. The reclassification for this data tabulation of those doctorate recipients who received permanent residency status under this program increased the ranks of recipients who were labeled "U.S. citizens and permanent residents."

The number of Hispanics receiving doctoral degrees in science and engineering increased by 92 percent over the 10-year period (from 296 in 1985 to 568 in 1995). Beginning in 1986, Hispanics became the underrepresented minority group receiving the highest number of science and engineering doctoral degrees awarded. Proportionate participation of Hispanics in science and engineering degrees increased as well: science and engineering degrees accounted for 47 percent of all Hispanic doctoral degrees in 1985 and increased to a majority of 54 percent of all degrees in 1995. Hispanics were the only underrepresented minority group to have over 50 percent of their doctoral degrees awarded in science and engineering fields. Approximately 7 percent of Hispanic doctorate recipients earned their degrees in engineering and 24 percent in the natural sciences. (See appendix table 4-39.)

The number of blacks receiving science and engineering doctoral degrees increased by 49 percent between 1985 and 1995 (from 374 to 557). Science and engineering degrees as a proportion of their total doctorates also increased but at the smallest rate of increase for underrepresented minorities: from 36 percent of degrees awarded in 1985 to 38 percent in 1995. The greatest concentration of blacks in science and engineering fields was in biology (13 percent of total degrees awarded to blacks) and in psychology (11 percent of total degrees). Five percent of black doctorate recipients earned their doctoral degrees in engineering, the smallest percentage for any racial/ethnic group. Most blacks (62 percent) earned their doctorates in non–science-and-engineering degrees; education was the most popular field, with 42 percent of black doctorates in that field alone. (See appendix table 4-39.)

American Indians increased their numbers of doctoral degrees in science and engineering by 68 percent over the 10-period, although the numbers were quite small in both years—41 in 1985 and 69 in 1995. Their percentage in science and engineering fields also increased, from 43 percent in 1985 to 47 percent in 1995. In 1995, 7 percent of American Indians earned their doctoral degrees in engineering. Almost 12 percent earned their doctorates in the social sciences and 10 percent in the biological sciences. Fifty-three percent earned their doctorates in non–science-and-engineering fields. Education was the most popular field for American Indians as well, with 27 percent of all their doctorates in that field. (See appendix table 4-39.)

The greatest number of science and engineering doctoral degrees continued to be awarded to whites (13,879, or 73 percent of the total science and engineering degrees to U.S. citizens and permanent residents). This number, however, represented an increase of only 14 percent since 1985, when whites received 12,169 science and engineering degrees. Whites were the only racial/ethnic group for which the *proportion* of total degrees awarded to science and engineering recipients was less in 1995 than in 1985, although the decrease was slight: from 57 percent of all doctoral degrees awarded to whites in 1985 to 56 percent in 1995. Although whites received 66 percent of the engineering degrees awarded to U.S. citizens and permanent residents in 1995, only 8 percent of their total degrees were received in engineering. (See appendix table 4-39.)

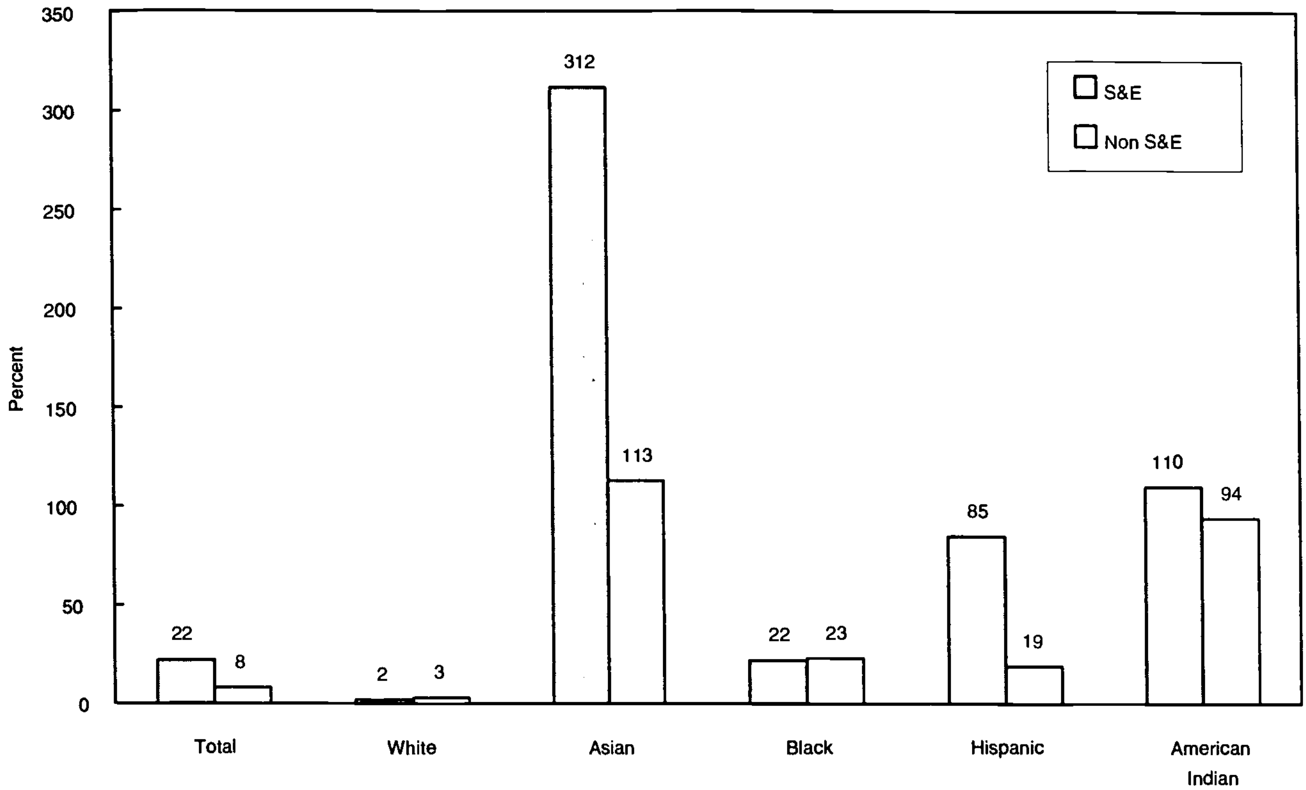
Doctorate Recipients by Sex and Racial/Ethnic Group

With one exception, since 1985 women from each racial/ethnic group outpaced the men from the same group in the rate of increase in doctorates awarded in both science and engineering fields and non–science-and-engineering fields. (See appendix tables 4-39 and 4-40.) The exception was the American Indians, in which women's percentage increase in doctorate degrees was much slower than the men's increase in all fields. For example, American Indian men doubled their number of total doctorate recipients over the 10-year period, from 40 to 81 degrees awarded. During the same time span, American Indian women increased their number of degrees by only 20 percent, from 56 doctorate degrees in 1985 to 67 degrees in 1997. (See figures 4-16 and 4-17.)

White women had a 7 percent increase in doctoral degrees overall, from 8,125 in 1985 to 11,123 in 1995. Their number of doctorates increased even faster (43 percent) in science and engineering, whereas their increase in non–science-and-engineering degrees was 32 percent. They tripled the number of engineering degrees they received over the 10-year time span, although the number of white women receiving an engineering doctorate was small in both years—106 in 1985 and 320 in 1995. Only 3 percent of white women earned their doctoral degrees in engineering in 1995. White women experienced a 38 percent increase in the number of science degrees awarded. On the other hand, white men were the only group—of both men and women of all racial/ethnic groups—to experience a decrease in the number of science degrees awarded. (See appendix table 4-40.)

Asian women received half the number of doctoral degrees in 1995 as Asian men (1,432 for women versus 2,868 for men), but the percentage growth in all fields was greater for women. Asian women increased their number of science degrees earned by 181 percent over the 10-year period and the number of engineering degrees by 700 percent. As for all women, the *number* of engineering degrees for Asian women

Figure 4-16.
Percentage increase in doctoral degrees awarded to male U.S. citizens and permanent residents, by racial/ethnic group: 1985–1995



See Appendix table 4-40.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

was also very small (168), but the *proportion* of Asian women receiving their degrees—15 percent of total degrees awarded to Asian females—was the highest for any women's group.

Women received a minority of science and engineering doctoral degrees in every racial/ethnic group—although black women were awarded close to half, receiving 48 percent of total science and engineering degrees awarded to blacks. Hispanic women received 41 percent of total science and engineering degrees awarded to Hispanics. Asian women received the lowest proportion of total doctorate degrees—they were the only women in any racial/ethnic group to earn a minority of non–science-and-engineering degrees (33 percent of total) as well as a minority of science and engineering degrees (30 percent). Black women were awarded a larger percentage of engineering degrees than any other female racial/ethnic group (21 percent of all black engineering degrees).

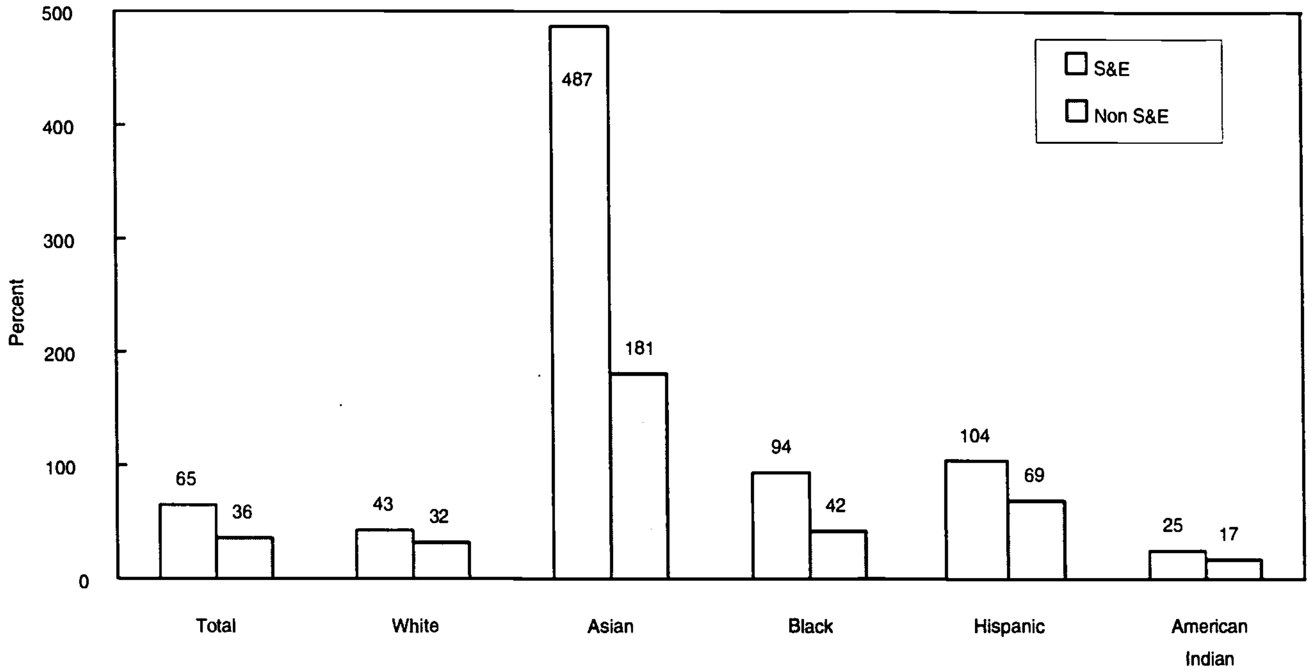
Financial Support to U.S. Citizens and Permanent Residents for Funding of Doctoral Expenses

As reported by the Survey of Earned Doctorates, 53 percent of the U.S. citizens and permanent residents who received science and engineering doctoral degrees in 1995 supported themselves primarily through university-administered support mechanisms, such as research assistantships (29 percent), teaching assistantships (14 percent), and fellowships and traineeships (11 percent). (See appendix table 4-41.) Approximately 47 percent of the U.S. citizens and permanent residents were financed by the "other" sources—loans or self-, family-, or industry-support.[15]

In general the receipt of the four university-administered modes of support reported by U.S. citizens and

[15] The tabulation of this "other" category also included those who did not answer the question.

Figure 4-17.
Percentage increase in doctoral degrees awarded to female U.S. citizens and permanent residents, by racial/ethnic group: 1985–1995



See Appendix table 4-40.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Elapsed Time Between Bachelor's and Doctoral Degrees for Scientists and Engineers

There are many reasons why some doctorate recipients take longer to complete their degrees than others—some of the mitigating factors include family, cultural, or societal considerations; extent of financial support received while studying; and full-time or part-time enrollment by choice or necessity. The choice of degree is also very important, because this often dictates the availability of university-administered financial assistance available. (See the sections on financial support for women and for minorities.) In general, however, three observations can be made about the amount of time beyond the bachelor's degree that is required for recipients to earn doctoral degrees:[16]

1. Persons without disabilities generally earn their doctoral degrees faster than persons with reported disabilities. In 1995, for instance, 82 percent of all doctorate recipients without reported disabilities had earned their degrees within 15 years of receiving the bachelor's degree. For persons with disabilities, only 72 percent had received their doctoral degrees within 15 years.

2. Men in general earn their doctorates faster than women. Of the total doctorate recipients in 1995, 83 percent of all men versus 79 percent of all women received the doctorate degree within 15 years of receipt of the bachelor's degree.

3. In general, Asians and whites earn their doctorates faster than the underrepresented minorities; among underrepresented minorities, blacks in general take longer to earn their doctorates than Hispanics or American Indians.

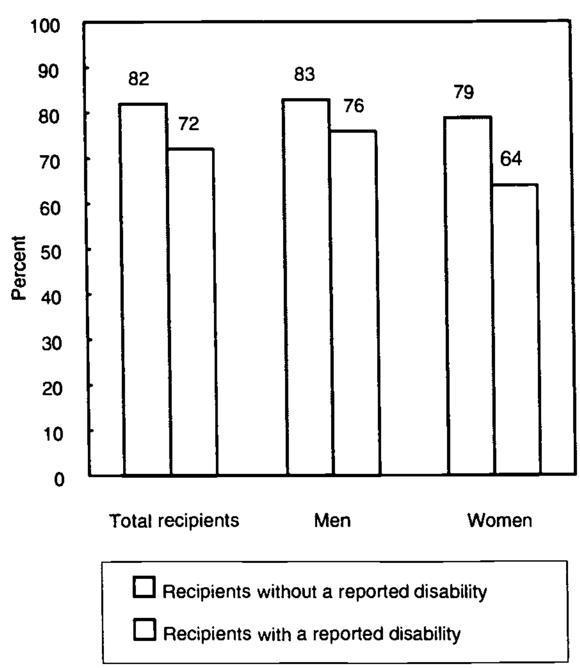
[16] In this discussion, time-to-degree denotes elapsed time between the bachelor's and doctoral degrees; that is not necessarily the amount of registered time pursuing the degree.

Elapsed Time Between Bachelor's and Doctoral Degrees for Scientists and Engineers *(continued)*

Time-to-Degree for Women With Disabilities

The first two generalized observations combine for women with disabilities, so that women with disabilities take considerably longer to receive their degrees than either men with disabilities or women in general. (See figure 4-18.) Seventy-nine percent of all women without reported disabilities and 76 percent of men with disabilities received their doctoral degrees within 15 years of a baccalaureate degree; only 64 percent of women with disabilities received their doctoral degrees within that time span. In fact, almost one quarter (22 percent) of women with disabilities took longer than 21 years to receive their doctoral degree. In comparison, 12 percent of men with disabilities, 8 percent of women without reported disabilities, and only 4 percent of men without reported disabilities took that long to receive their doctoral degrees. (See appendix table 4-46.)

Figure 4-18.
Percentage of science and engineering doctorate recipients who received their doctoral degrees within 15 years of receipt of their bachelor's degree, by disability status and sex: 1995



See appendix table 4-46.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Time-to-Degree for Racial/Ethnic Groups

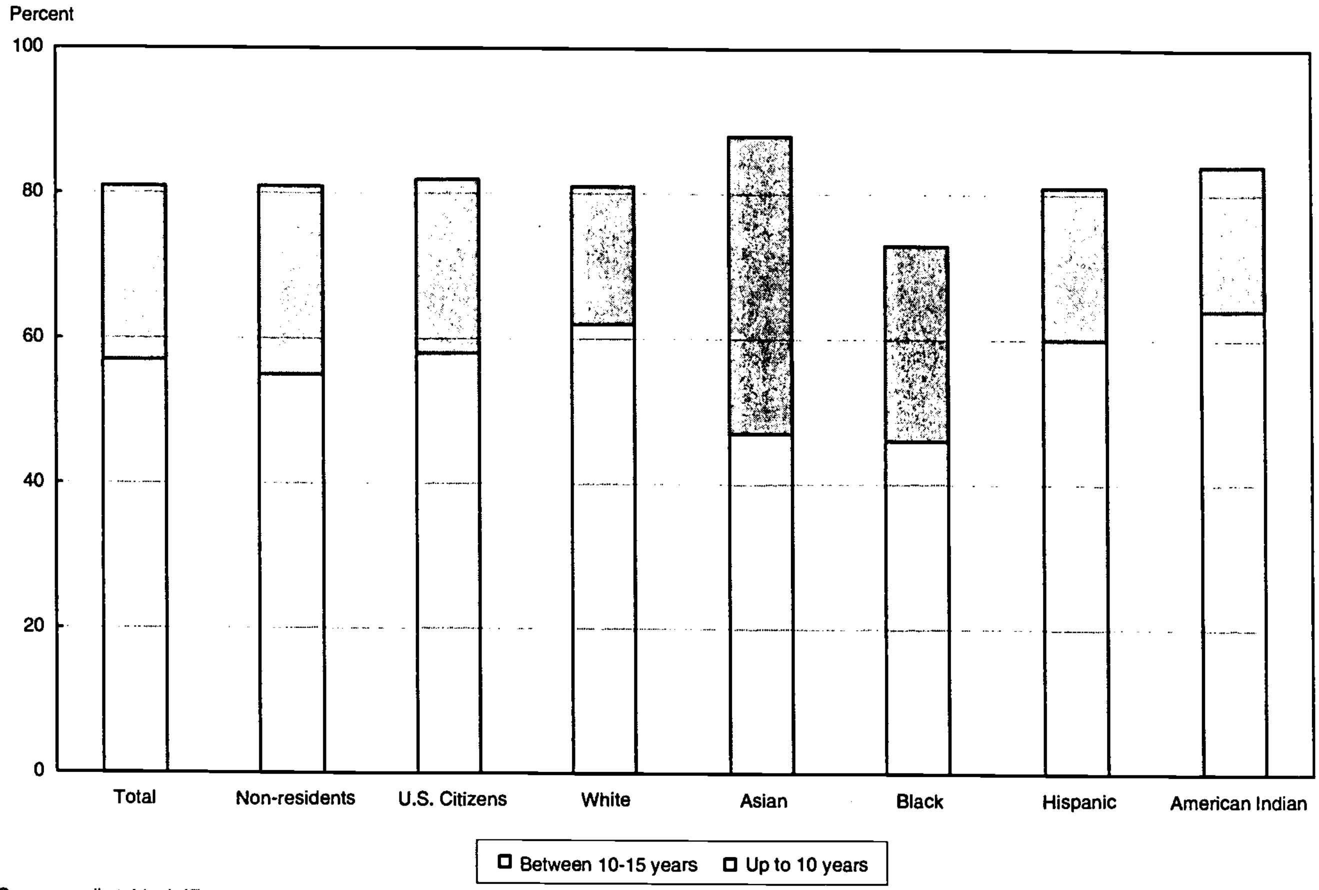
The same restrictions of choice of degree hold for racial/ethnic groups as well; some fields of study offer far fewer opportunities for university-administered support to the degree candidate. For all degrees combined, 82 percent of all doctorate recipients received their degrees within 15 years of receiving the bachelor's degree. The data are very similar for both nonresident aliens (82 percent received the degree within 15 years) and U.S. citizens and permanent residents (81 percent).

For the latter recipients, however, there are striking differences in the proportion of the different racial/ethnic groups who received the doctorate degree within the relatively short 10 years from the baccalaureate degree and those receiving their degrees during the next 5 years (for a total of 15 years from the baccalaureate). For those who receive their doctoral degrees within 10 years, the *proportion* taking the shortest time were American Indians (64 percent of total American Indian recipients had received their degrees by 10 years after the baccalaureate, although the total number of recipients is very small—42 recipients). Whites had the next highest proportion, 62 percent, and Hispanics were close behind with 60 percent of the recipients receiving the doctoral degree by 10 years after the baccalaureate. Asians (47 percent) and blacks (46 percent) had much smaller proportions of their recipients on this fast track in the early years.

The picture changes by 15 years after the baccalaureate, however. (See figure 4-19.) Forty-one percent of Asians received their doctorate in the next 5 years, so that Asians led the percentage of doctorate recipients (87 percent) who received their science and engineering doctorates within 15 years of the baccalaureate. All other racial/ethnic groups, except for blacks, had over 80 percent of their doctorate recipients receiving their degrees within 15 years of the baccalaureate degree—American Indians (84 percent, although the numbers remained small—just 58 recipients received their science and engineering degrees within 15 years of the baccalaureate); Hispanics (82 percent); and whites (81 percent). Only 73 percent of blacks had received their science and engineering degrees within 15 years of the baccalaureate, however. (See figure 4-19.) A larger proportion of black doctorate recipients (10 percent) and whites (9 percent) than other racial/ethnic groups took over 20 years from the baccalaureate to receive the doctoral degree. Only 3 percent of the Asian doctorate recipients took that long to receive their science and engineering doctoral degrees. (See appendix table 4-47.)

Elapsed Time Between Bachelor's and Doctoral Degrees for Scientists and Engineers *(continued)*

Figure 4-19.
Percentage of science and engineering doctorate recipients who received their doctoral degrees within 10 years and within 15 years of their bachelor's degree, by race/ethnicity: 1995



See appendix table 4-47.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

permanent residents reflected each group's proportion of the total numbers of doctorates awarded. For example, whites constituted 73 percent of doctoral degree recipients and received approximately 73 percent of the teaching assistantships and fellowships and traineeships. They constituted 68 percent of the research assistantships.

Asians received 19 percent of total doctoral degrees awarded to U.S. citizens and permanent residents in 1995. They received 28 percent of all research assistantships, 22 percent of all teaching assistantships, and 14 percent of the fellowships and traineeships.

The underrepresented minorities were more likely to receive traineeships and fellowships (many of which are minority-targeted) and less likely to receive research and teaching assistantships. For example, blacks constituted about 3 percent of total doctoral degrees received by U.S. citizens and permanent residents but received 7 percent of the fellowships and traineeships. They received 1 percent of the research assistantships and 2 percent of the teaching assistantships.

Like blacks, Hispanics also constituted approximately 3 percent of the total doctorate recipients who were U.S. citizens and permanent residents. They received 5 percent of the fellowships and traineeships and 2 percent of both research assistantships and teaching assistantships.

American Indians constituted less than 0.5 percent of the total doctorate recipients who were U.S. citizens

and permanent residents. They received just over 0.5 percent of the traineeships and fellowships and less than 0.5 percent of all the other sources of support.

The broad field offering the largest proportion of research assistantships was the physical sciences; 45 percent of recipients of physical science doctorates received their primary means of support from research assistantships. Over one-third of the physical sciences doctorates of each racial/ethnic group, except for blacks, received research assistantships—34 percent of the Hispanics, 45 percent of the whites, 47 percent of the Asians, and 67 percent of the American Indians (again their numbers were small, with only six physical science recipients in 1995). Blacks had a much smaller percentage: only 9 percent of black physical science doctorates received their primary means of support from research assistantships. This group was the smallest in terms of numbers; only four blacks received research assistantships in the physical sciences.

The field offering the next largest proportion of research assistantships was engineering; 42 percent of all engineering doctorate recipients reported this mechanism as their primary means of support. Asians received a larger proportion of research assistantships in engineering than their proportion of the engineering population. They received 31 percent of all engineering doctorates to U.S. citizens and permanent residents in 1995 and held 38 percent of all the engineering research assistantships. (See appendix table 4-41.) Whites received 63 percent of the total engineering doctoral degrees awarded to U.S. citizens and permanent residents in 1995 and 59 percent of the research assistantships. Blacks and Hispanics each received about 2 percent of total engineering degrees and about 1 percent of the research assistantships in engineering.

As a proportion of each racial/ethnic group, a larger proportion of Asians than other racial/ethnic groups received research assistantships in engineering. Fifty-two percent of Asian engineering doctorate recipients received their primary means of support by this method. In contrast, 40 percent of the white engineering recipients, 30 percent of the American Indian (but a small number—three total), 22 percent of Hispanics, and 17 percent of black engineering doctorates listed research assistantships as their primary means of support.

Doctoral Degrees Received by Persons With Disabilities[17]

The number of persons with reported disabilities who received science and engineering doctoral degrees in 1995 was very small, but the total has been increasing rapidly: the 355 recipients in 1995 were a 78 percent increase from the 200 science and engineering recipients in 1989. Persons reporting disabilities constituted 1.3 percent of all doctorate recipients in 1995, up from 0.9 percent of the total in 1989. (See appendix table 4-42.)

In science and engineering fields, the concentration pattern for persons with disabilities was different from the concentration pattern for persons with no reported disability. Forty percent of all science and engineering doctorates received by persons with disabilities were in the social sciences and psychology (20 percent in each field.) This segment was much larger than the 28 percent of science and engineering doctorates in these two fields received by persons with no reported disability (15 percent of all recipients received their doctorates in social sciences, and 13 percent received their doctorates in psychology). (See appendix table 4-43.) Persons with disabilities made up approximately 2 percent of the total number of doctorates in each of these two fields.

Only 18 percent of persons with disabilities received their doctoral degree in engineering versus 23 percent of the doctorate recipients without disabilities. However, since 1989 the percentage of degrees awarded to persons with disabilities has risen faster in engineering than in any other field. There was an increase of 152 percent in the number of engineering degrees awarded to persons with disabilities, from 25 in 1989 to 63 in 1995 (see appendix table 4-42); during the same time span, the number of engineering doctorate recipients overall rose only 32 percent. The total number of persons with disabilities who were awarded doctoral degrees in science also increased faster than the total number of degrees: the number of science recipients with reported disabilities increased 67 percent (from 175 in 1989 to 292 in 1995), whereas the overall increase in science degrees between 1989 and 1995 was 19 percent.

Types of Disabilities

Overall, 27 percent of doctorate recipients with disabilities reported a visual disability, and 27 percent reported that they had a disability in mobility. Engineering recipients with disabilities were more likely to have visual impairments (37 percent) than recipients of science doctorates (25 percent). Mobility disabilities were the most common reported by science doctorate recipients (28 percent). The proportion was little changed from 1989. (Appendix table 4-44 depicts the types of disabilities reported by the doctoral recipients in 1989 and 1995.)

The number of doctorate recipients with disabilities who had vocal problems was only 1 percent overall and very small in both sexes. Fewer of the female recipients with disabilities (9 percent) reported auditory problems than the males (15 percent). (See appendix table 4-45.)

[17] There are no comparable data collected for master's degree recipients.

Women With Disabilities

Women overall received 31 percent of the total science and engineering doctorates, but they received 34 percent of the science and engineering degrees awarded to persons with disabilities. Women with disabilities generally took longer to receive their doctoral degrees than did either men with disabilities or all doctorate recipients. (See "Elapsed Time Between Bachelor's and Doctoral Degrees for Scientists and Engineers.")

References

Eschbach, Karl, Khalil Supple, and C. Matthew Snipp. 1998. Changes in Racial Identification and the Educational Attainment of American Indians, 1970–1990. *Demography,* 35 (1), 35–43.

Ibarra, Robert A. 1996. Latino Experiences in Graduate Education: Implications for Change. In Nancy Gaffney (Ed.), *Enhancing the Minority Presence in Graduate Education VII.* Washington, DC: Council of Graduate Schools.

National Science Foundation. 1996. Undergraduate Origins of Recent (1991–95) Science and Engineering Doctorate Recipients *(NSF 96-334). Arlington, VA: National Science Foundation.*

Syverson, Peter D., and Stephen R. Welch. 1996. Early Data Release From the 1995 CGS/GRE Survey of Graduate Enrollment. *Washington, DC: Council of Graduate Schools.*

CHAPTER 5

EMPLOYMENT

Overview

This chapter examines the participation and employment characteristics of women, minorities, and persons with disabilities in the science and engineering labor force in 1995.[1] Representation is examined, in most cases, in terms of age, field of employment,[2] and highest degree level. These factors influence employment patterns; to the extent that men and women, minorities and nonminorities, and persons with and without disabilities differ on these factors, their employment patterns are likely to differ as well.

Within the science and engineering labor force, the age distributions of women compared to men, and of minorities compared to the majority, are quite different. Because large numbers of women and minorities have entered science and engineering fields only relatively recently, women and minority men are generally younger and have fewer years of experience. Age or stage in career is an influence on such employment-related factors as salary, rank, tenure, and work activity. Employment patterns also vary by field, and these field differences may influence employment in science and engineering jobs, unemployment, salaries, and work activities. Highest degree earned is also an important influence on employment, particularly on primary work activity and salary.

Women Scientists and Engineers

Representation in Science and Engineering

Women were slightly more than one-fifth (22 percent) of the science and engineering labor force, but close to half (46 percent) of the U.S. labor force in 1995. (See text table 1-1.) Although changes in the National Science Foundation (NSF) surveys do not permit analysis of long-term trends in employment, short-term trends show some increase in the representation of doctoral women in science and engineering employment: women were 22 percent of doctoral scientists and engineers in the United States in 1995 (see appendix table 5-1), compared with 20 percent in 1993 and 19 percent in 1991.[3]

Age Distribution

As will be seen, many of the differences in employment characteristics between men and women are partially due to differences in age. Women in the science and engineering workforce are younger, on average, than men: 18 percent of women and 12 percent of men employed as scientists and engineers were younger than age 30 in 1995. (See appendix table 5-2.)

Field of Science and Engineering

As is the case in degree fields (see chapters 3 and 4), women and men differ in field of employment. Women are more highly represented in some science and engineering fields than in others. For example, women are more than half of psychologists and 47 percent of sociologists, but 12 percent of physicists and 9 percent of engineers. (See figure 5-1 and appendix table 5-1.) Within engineering, women are also more highly represented in some fields than in others, for example, women are 13 percent of chemical and industrial engineers, but 6 percent of aerospace, electrical, and mechanical engineers.

Educational Background

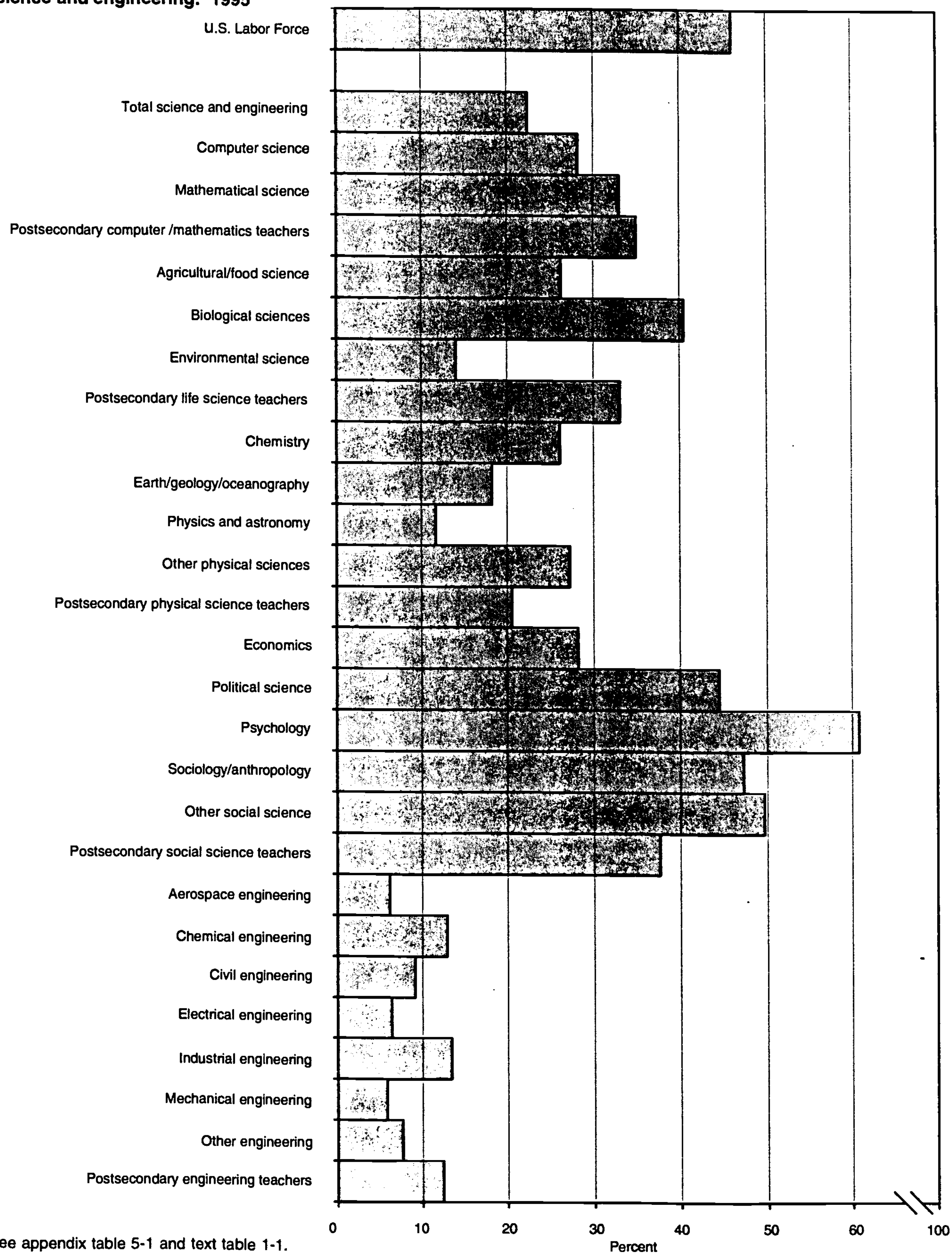
Women scientists have, in many occupational fields, a lower level of educational attainment than men. In the science labor force as a whole, 15 percent of women and 21 percent of men hold doctoral

[1] The data in this chapter are from the 1995 SESTAT Integrated Data Files—a combination of three NSF surveys measuring the employment, education, and demographic characteristics of scientists and engineers in the United States. The surveys were substantially revised in the 1990s and differ from those conducted in the 1980s in terms of the sample, design, question wording, and response rates. In most cases, therefore, it is not possible to present trend data.

[2] Throughout this chapter, scientists and engineers are defined in terms of field of employment not degree field. See appendix A for the SESTAT classification of science and engineering and non–science-and-engineering fields.

[3] For 1991 figures, see *Women, Minorities, and Persons with Disabilities in Science and Engineering: 1994*, p. 95. For 1993 figures, see *Women, Minorities, and Persons with Disabilities in Science and Engineering: 1996*, p. 63.

Figure 5-1.
Women as a percentage of the U.S. labor force and of the science and engineering labor force, by field of science and engineering: 1995



See appendix table 5-1 and text table 1-1.

degrees. (See appendix table 5-1.) In biology, 25 percent of women and 41 percent of men hold doctoral degrees; in chemistry, 13 percent of women and 27 percent of men hold doctoral degrees; and in psychology, 22 percent of women and 39 percent of men hold doctoral degrees. Differences in highest degree influence differences in the type of work performed, employment in science and engineering jobs, and salaries. In engineering, only about 5 percent of both men and women have doctoral degrees.

Labor Force Participation, Employment, and Unemployment

Men scientists and engineers are more likely than women to be in the labor force, to be employed full time and to be employed in their field of highest degree. Women are more likely than men to be out of the labor force, to be employed part time, and to be employed outside their field. Some of these differences are due to differences in the age distributions of men and women, and some are due to family-related reasons, such as demands of a spouse's job or presence of children.

The labor force participation rates of men and women with current or former science and engineering occupations are similar—87 percent of women and 88 percent of men are in the labor force. Conversely, 13 percent of women and 12 percent of men are not in the labor force (that is, not working and not seeking employment). Among those in the labor force, moreover, unemployment rates[4] of men and women scientists and engineers are similar: 2.0 percent of women and 2.2 percent of men were unemployed in 1995. (See appendix table 5-3.)

Overall similarities in labor force participation, however, mask differences within age groups. Although similar percentages of men and women are out of the labor force, the women who are out of the labor force are younger than the men who are out of the labor force. Most (60 percent) of the women who are out of the labor force are younger than age 45, but most (86 percent) of the men who are out of the labor force are age 55 or older.

Reasons for not working (whether out of the labor force or unemployed) differ in some respects by sex. Women were more likely than men to cite family responsibilities (40 percent versus 1 percent), and men were more likely than women to cite retirement (75 percent versus 21 percent). (See appendix table 5-4.) These differences reflect differences in the age distributions of men and women as well as differences in role responsibilities.

Women scientists and engineers were less likely than men to be employed full time in their field.[5] Of those who were employed, 74 percent of women and 86 percent of men were employed full time in their degree field. (See appendix table 5-3.) The fraction employed full time outside their degree field, however, was roughly similar for men and women: 10 percent of women and 9 percent of men were employed full time outside their degree field. For the most part, the reasons given for working outside their degree field were similar for both sexes: 36 percent of men and 37 percent of women cited pay or promotion opportunities and 23 percent of both cited change in career or professional interests. (See appendix table 5-5.) Women, though, were more likely than men to cite family-related reasons (for example, children, spouse's job moved) (7 percent versus 2 percent).

A major reason for the lower percentage of women scientists and engineers in full-time employment is their higher percentage in part-time employment. Of those who were employed, 16 percent of women and 5 percent of men were employed part time. (See appendix table 5-3.) Women who were employed part time were far more likely than men to cite family responsibilities as the reason. Forty-two percent of the women working part time and 7 percent of the men cited family responsibilities as the reason for working part time. (See appendix table 5-6.) Thirty-one percent of men and 4 percent of women cited retirement as the reason for part-time employment. As was the case with unemployment, the differences in age distribution of men and women, as well as differences in role responsibilities, account for these differences in reasons for part-time employment.

Sector of Employment

Within fields, women are about as likely as men to choose industrial employment. For example, among physical scientists, 54 percent of women and 50 percent of men are employed in business or industry. (See appendix table 5-7.) Among employed scientists and engineers as a whole, women are less likely than men to be employed in business or industry and are more likely to be employed in educational institutions: 50 percent of women and 65 percent of men are employed in for-profit business or industry and 26 percent of women and 15 percent of men are employed in educational institutions. These differences in sector,

[4] The unemployment rate is the ratio of those who are unemployed and seeking employment to the total labor force (that is, those who are employed plus those who are unemployed and seeking employment). Those who are not in the labor force (that is, those who are unemployed and not seeking employment) are excluded from the denominator.

[5] A respondent is employed "in field" if he or she responded that his or her current work is "closely related" or "somewhat related" to field of highest degree.

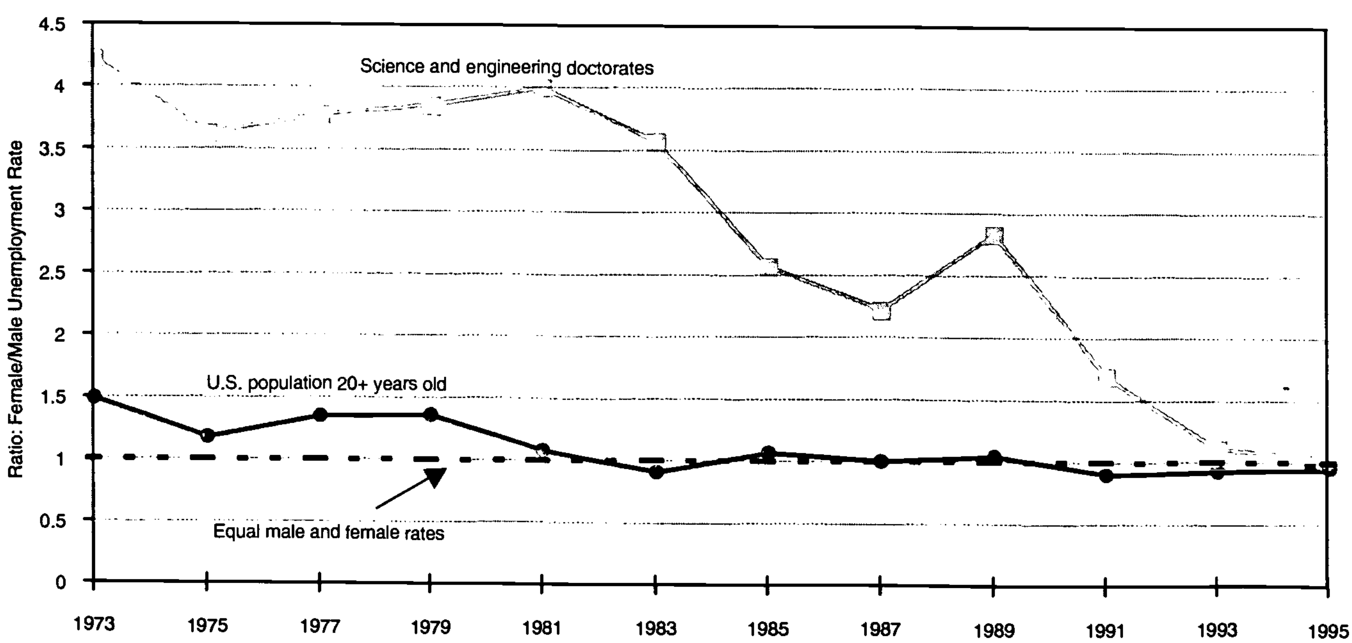
Is the Gender Gap in Unemployment Disappearing?

In 1995, the unemployment rate for both men and women who hold doctoral degrees in science and engineering was 1.5 percent. This figure is in stark contrast to the situation in 1973, when Maxfield et al. (1976, p. 5) found "the unemployment rate for women...substantially higher than that for men (3.9 percent versus 0.9 percent)." In the intervening years, the gender gap in unemployment, measured by the ratio of female to male unemployment, steadily narrowed. (See figure 5-2.)

Results of studies of the gender gap, controlling for other factors are consistent with the premise that the gender gap in unemployment among those with doctoral science and engineering degrees is disappearing. Maxfield et al. (1976) found that in 1973 in all age groups and all degree fields, women had considerably higher unemployment rates than men. The smallest reported difference was in the field of mathematics where the rate was 1.9 percent for women, compared to 1.4 percent for men. An NSF study of factors affecting unemployment in the 1993 doctoral science and engineering population (NSF, 1997) found no statistically significant difference between men and women, after controlling for such variables as field of degree and years since degree.

The vanishing gender gap in the doctoral science and engineering population is a reflection of a similar trend in the general population (U.S. Department of Labor, 1994, p. 32). In 1973, the unemployment rate for women in the general U.S. population age 20 and over was substantially higher (4.9 percent) than that for men (3.3 percent). The gender gap in the general population had been eliminated by the early 1980s, approximately a decade before its disappearance in the science and engineering doctoral population.

Figure 5-2.
Ratio of female to male unemployment rates of persons with doctoral degrees in science and engineering and persons 20 years of age and over in the overall population: 1973–1995



SOURCES: Doctoral statistics from National Science Foundation/SRS, Survey of Doctorate Recipients. General population figures from Bureau of Labor Statistics, Current Population Survey.

Preferences for Careers in Science and Engineering

Preferences for nonacademic, academic research, or academic teaching careers differ by sex and by field (Fox and Stephan, 1996). Preferences for academic research careers were found to be higher for men than for women, preferences for academic teaching careers were found to be higher for women than for men, and preferences for nonacademic careers did not differ by sex. These overall differences or similarities are confounded by field differences. Differences between men's and women's preferences for academic research careers were greatest in chemistry, microbiology, and computer science. Differences between men's and women's preferences for nonacademic careers, although nonexistent in the aggregate, were evident in computer science, electrical engineering, and physics. These findings are the result of a survey of 3,800 doctoral students in departments of chemistry, computer science, electrical engineering, microbiology, and physics in 1993–1994 of which 2,348 (62 percent) responded.

however, are mostly related to differences in field of degree. Women are less likely than men to be engineers or physical scientists. who tend to be employed in business or industry.

Academic Employment

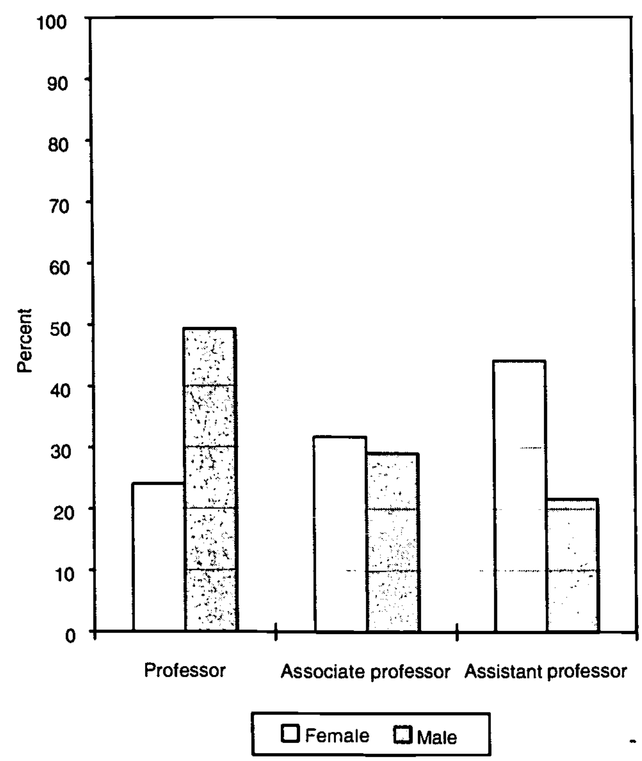
The career patterns of women in academic employment are quite different from those of men. Women differ from men in terms of type of school, rank, tenure, and research productivity. Among all scientists and engineers in academic employment, women are more likely than men to be employed in elementary or secondary schools (11 percent versus 4 percent) and in 2-year colleges (12 percent versus 9 percent). (See appendix table 5-8.)

In 4-year colleges and universities, women scientists and engineers hold fewer high-ranked positions than men. Women are less likely than men to be full professors and are more likely than men to be assistant professors. (See figure 5-3.) Among ranked science and engineering faculty, 49 percent of men and 24 percent of women are full professors. Part of this difference in rank can be explained by age differences, but differences in rank remain even after controlling for age. For example, among those ages 45 to 54, 40 percent of women and 61 percent of men are full professors. (See appendix table 5-9.)

Women are also less likely than men to be tenured. Thirty-five percent of full-time employed women science and engineering faculty are tenured, compared to 59 percent of men. As was the case with rank, some, but not all, of the differences in tenure may be attributable to differences in age. Among full-time employed science and engineering faculty ages 45 to 54, 57 percent of women and 76 percent of men are tenured. (See appendix table 5-10.)

Part of the difference in rank and tenure may be due to research productivity (as measured by number of publications). The most important factors influencing promotion in academia are time in rank and productivity (Long et al., 1993). Although roughly the same proportion of men and women had no publications (17 percent of women and 18 percent of men), women had fewer publications in refereed journals than men in the 5-year period 1990–1995. Among doctoral scientists and engineers who were employed full time in colleges or universities and who received their doctorates in 1990 or earlier, 45 percent of women and 34

Figure 5-3.
Academic rank of full-time employed ranked science and engineering faculty in 4-year colleges and universities, by sex: 1995



See appendix table 5-9.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Do Men and Women Have Different Styles of Doing Science?

Some believe that gender influences the way scientists work and their choice of research subject (Sonnert and Holton, 1995a). This research suggests that many women follow a "niche" approach in selecting research problems—they create their own area of expertise rather than competing with other researchers in "hot" fields. Sonnert and Holton's interviews with 92 men and 108 women who had received postdoctoral fellowships in the sciences from NSF, the National Research Council, the Bunting Institute of Radcliffe College, or who had been Bunting finalists suggest that women may publish fewer papers because they take longer on a project, are more thorough and perfectionist, and take on broader projects than men. Women's articles have been found to have more citations per article than men's (Long, 1992; Garfield, 1993; Sonnert, 1995b.)

percent of men had one to five publications, and 38 percent of women and 48 percent of men had more than five publications. (See appendix table 5-11.) Differences in field as well as differences in age or years since doctorate are likely to explain some of the differences in publication rates.

Patent activity follows a pattern similar to publication activity: women are less likely than men to have patents. Among full-time employed doctoral natural scientists and engineers[6] who are employed in colleges or universities and who received their doctorates in 1990 or earlier, 7 percent of women and 11 percent of men had been named on applications for patents since 1990. (See appendix table 5-11.)

Differences in research support do not appear to be a factor in differences in publications and patents. Women faculty are as likely as men to be supported on Federal contracts or grants—44 percent of women and 45 percent of men faculty were supported by Federal contracts or grants. (See appendix table 5-12.)

Nonacademic Employment

Differences in field influence differences in primary work activities. For example, men are more likely than women to be engineers and physical scientists and are thus more likely to be engaged in research and development. Therefore, it is not surprising that the primary work activity of women scientists and engineers in business or industry differs from that done by men. For example, 28 percent of women and 40 percent of men report research and development as their primary work activity. Women, however, are as likely as men to be in management or administration—22 percent of men and 18 percent of women cite management or administration as their primary work activity.[7] (See appendix table 5-13.) Among those of similar ages, even less difference in managerial status is evident. For example, among scientists and engineers between the ages of 35 and 44, 19 percent of women and 21 percent of men are managers or administrators.

Although men and women of similar ages are about equally likely to be managers, men have more subordinates.[8] Women who are first-line supervisors have, on average, fewer total (direct plus indirect) subordinates than men. Women supervisors have, on average, 8 direct and indirect subordinates, whereas men have 12. (See appendix table 5-14.) This disparity in number of subordinates holds true among age groups as well.

The size of one's employer is an important factor in opportunities for promotion and advancement, salaries, and benefits. Potentially, employer size could explain some of the differences in opportunities and salaries experienced by men and women. Men and women scientists and engineers, however, do not differ in terms of employer size—4 percent of both work for very small firms (under 10 employees) and 44 percent of women and 45 percent of men work for large firms (5,000 or more employees.) (See appendix table 5-15.)

Publications are less important to one's career in business or industry than they are in academic employment. Almost half of both men and women PhDs employed in business or industry have no publications. Among doctoral scientists and engineers who were employed full time in business or industry and who received their doctorates in 1990 or earlier, 49 percent of women and 46 percent of men had no publications. Unlike the case in academic employment, women in business or industry have as many publications in

6 The prevalence of patents by social scientists was so low they were excluded from this analysis.

7 This difference is not statistically significant.

8 It should be noted that in the SESTAT data files, only first-line supervisors are considered scientists and engineers. Midlevel and top managers and administrators are not considered to be in science and engineering occupations. Because this analysis was limited to people employed as scientists and engineers, those midlevel and top managers and administrators were excluded.

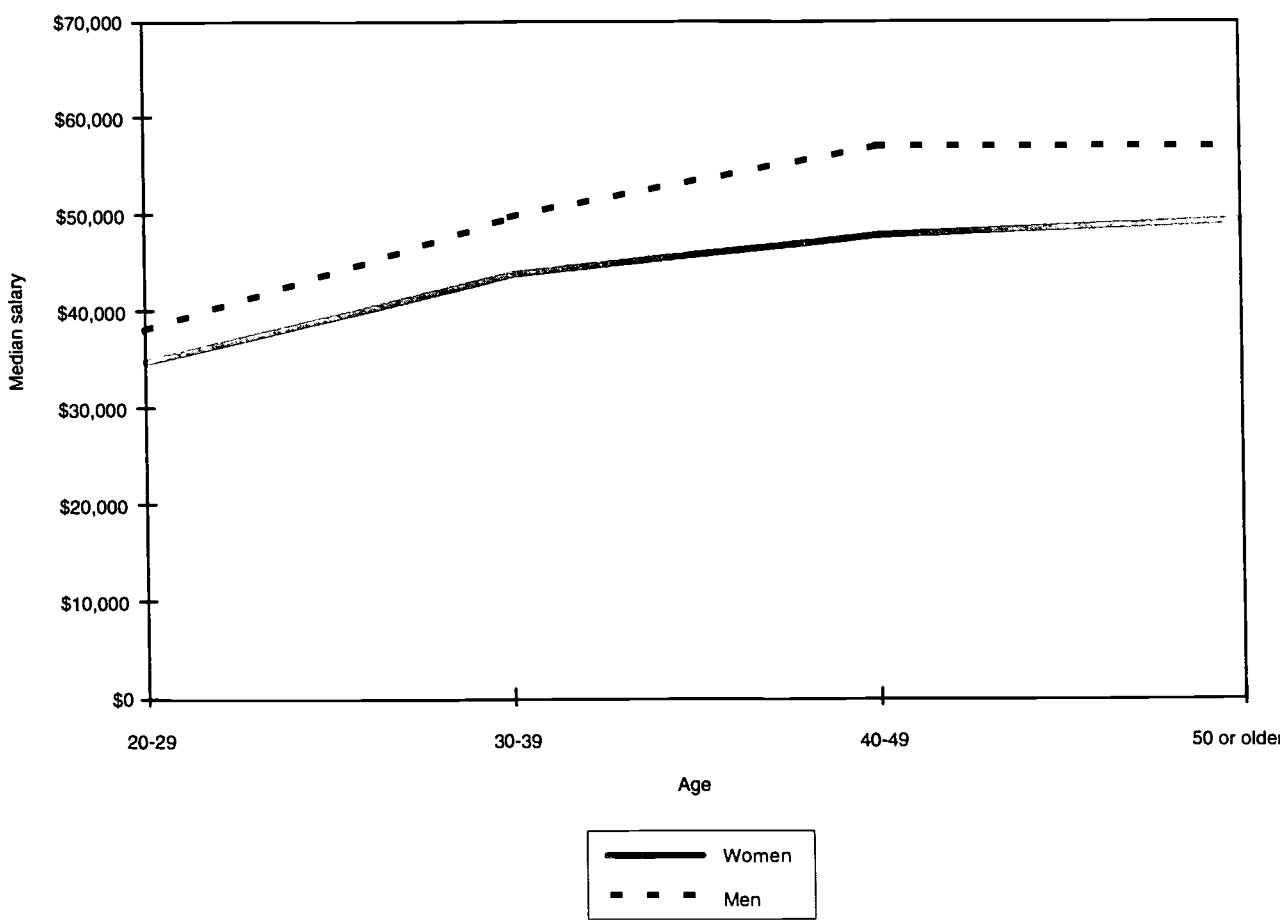
refereed journals as men: 14 percent of women and 15 percent of men had more than five publications. (See appendix table 5-16.)

In contrast to publications, patents are of greater importance among scientists and engineers employed in industry. Women, though, are less likely than men to have patents. Among natural scientists employed in business or industry in 1995, 28 percent of women and 39 percent of men had been named on applications for patents since 1990. (See appendix table 5-16.)

Salaries

Full-time employed women scientists and engineers generally earn less than men, but differences in salary by gender are due primarily to differences in age and field. Women scientists and engineers are younger, on average, than men and are less likely than men to be in computer science or engineering, fields which command higher salaries. The overall median salary for women ($42,000) is much lower than that for men ($52,000) but within fields and within younger age categories, the median salaries of men and women vary considerably, but are more nearly the same. (See appendix table 5-17.) For example, among computer and mathematical scientists with bachelor's degrees between the ages of 20 and 29, the median salary for women was $35,000, and for men it was $38,000 in 1995. With increasing age, however, the gap in salaries of men and women widens. (See figure 5-4.) For example, among computer and mathematical scientists with bachelor's degrees between the ages of 40 and 49, the median salary for women was $48,000 and for men was $57,000. The lesser prevalence of women in higher positions in academe and industry explains some

Figure 5-4.
Median annual salaries of bachelor's computer scientists, by sex and age: 1995



See appendix table 5-17.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

of this difference. Comparisons of men and women in the same field, the same age group, the same rank or position, and with a similar number of subordinates, would reveal salaries more nearly the same. See the previous version of this report (NSF, 1996) for a more detailed explanation of the influences on salaries for men and women.

Minority Scientists and Engineers[9]

Representation in Science and Engineering

With the exception of Asians, minorities are a small proportion of scientists and engineers in the United States. Asians were 10 percent of scientists and engineers in the United States in 1995, although they were 3 percent of the U.S. population. Blacks, Hispanics, and American Indians as a group were 23 percent of the U.S. population and 6 percent of the total science and engineering labor force in 1995.[10] Blacks and Hispanics were each about 3 percent, and American Indians were less than half of 1 percent of scientists and engineers. (See figure 5-5.)

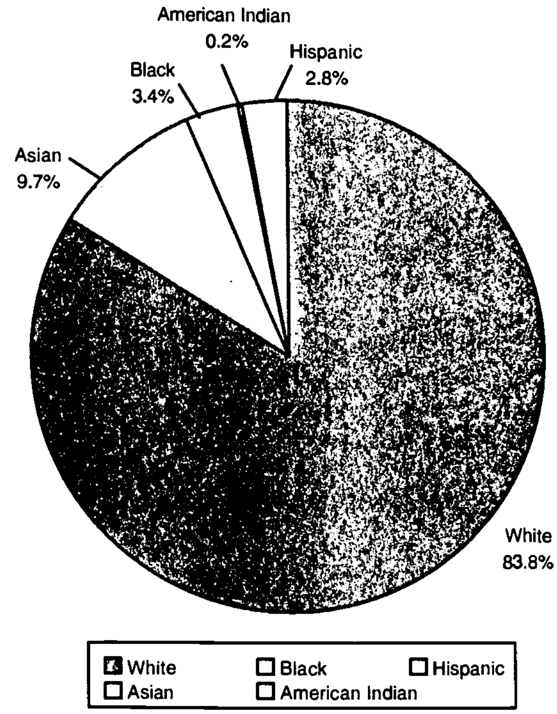
Age Distribution

The age distributions of minorities, including Asians, differ from that of white scientists and engineers. As noted earlier, these differences influence differences in employment characteristics. About 13 percent of employed white scientists and engineers are younger than age 30, compared with between 16 and 20 percent of Asian, black, and Hispanic scientists and engineers. (See appendix table 5-2.)

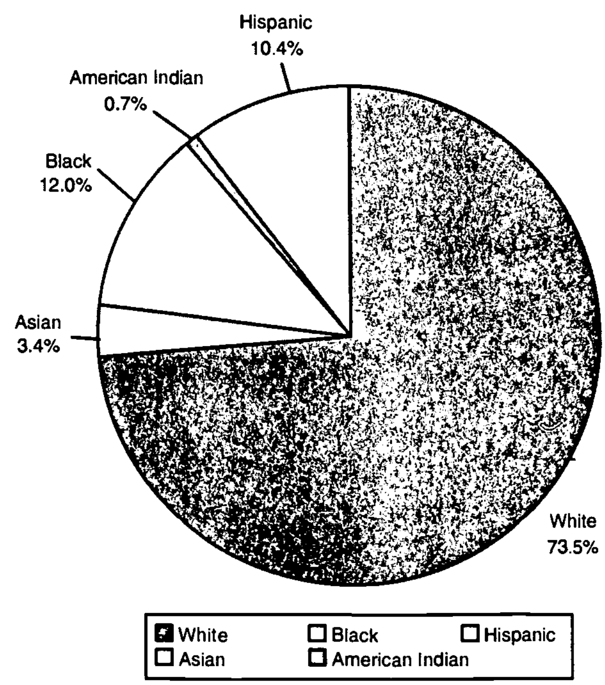
Field of Science and Engineering

Black, Asian, and American Indian scientists and engineers are concentrated in different fields than white and Hispanic scientists and engineers. (See figures 5-6 to 5-10.) Asians are less represented in social sciences than they are in other fields. They are 4 percent of social scientists but 10 percent of engineers and computer scientists. A higher proportion of black scientists and engineers are in social sciences and in computer and mathematical sciences than they are in other fields. They are 5 percent of social scientists, 4 percent of computer and mathematical scientists, and roughly 3 percent of physical scientists, life scientists,

Figure 5-5.
Scientists and engineers in the labor force, by race/ethnicity: 1995



The resident population of the United States, by race/ethnicity: 1995



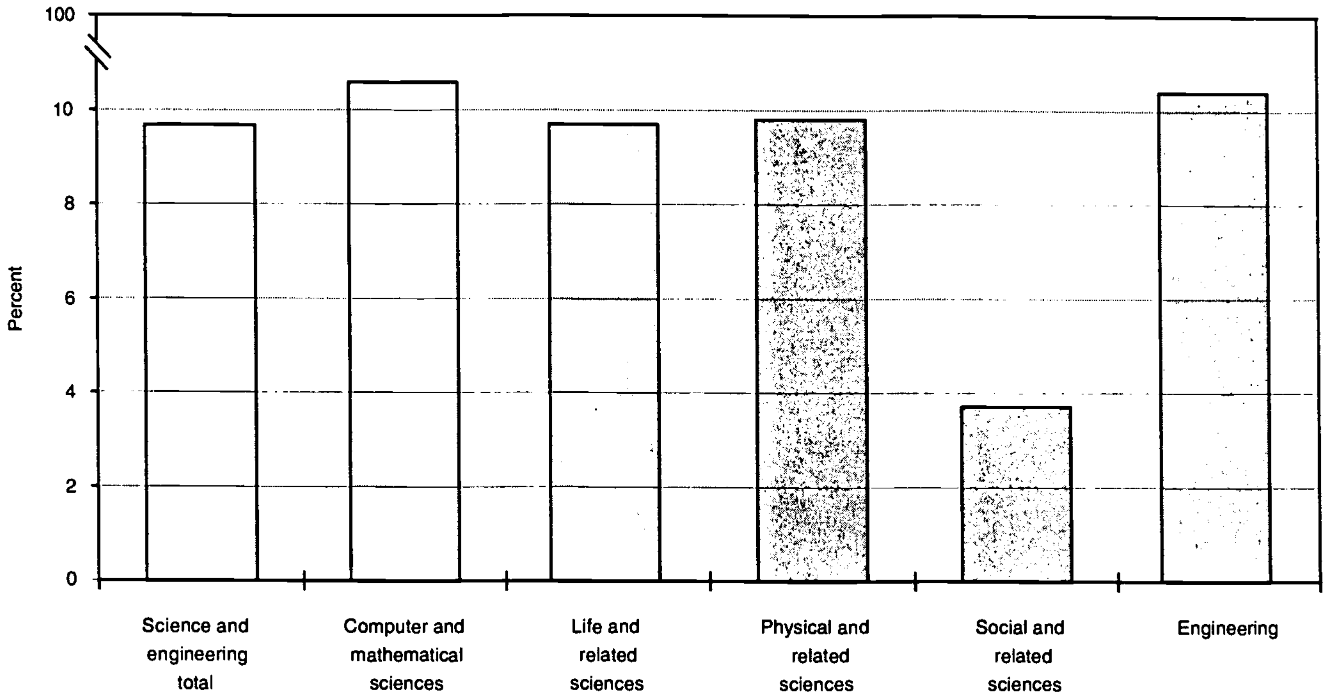
See text table 1-1.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

[9] The data reported in this section include all scientists and engineers, regardless of citizenship or country of origin, unless otherwise noted.

[10] The science and engineering field in which blacks, Hispanics, and American Indians earn their degrees influences participation in the science and engineering labor force. Blacks, Hispanics, and American Indians are disproportionately likely to earn degrees in the social sciences (defined by NSF as degrees in science and engineering) and to be employed in social services occupations, e.g., social worker, clinical psychologist, that are defined by NSF as non–science-and-engineering occupations. See appendix A for NSF's classification of science and engineering fields.

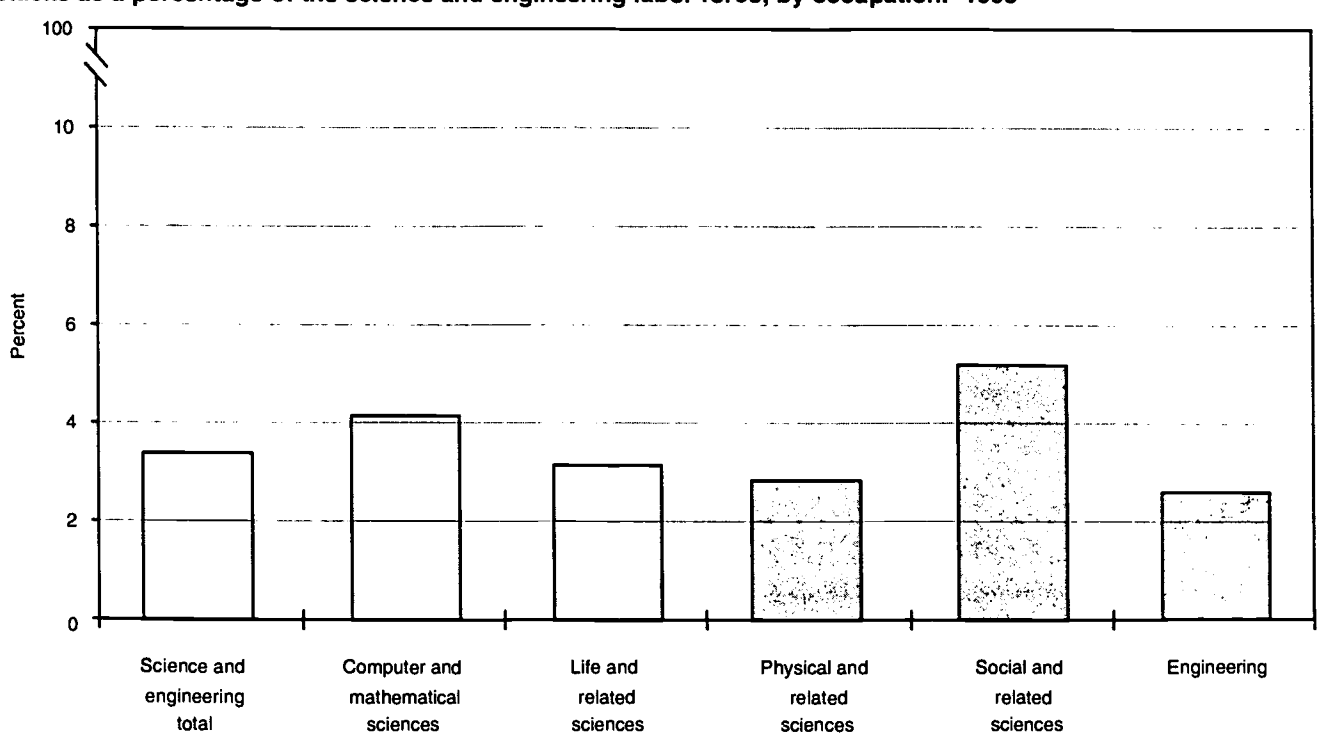
Figure 5-6.
Asians as a percentage of the science and engineering labor force, by occupation: 1995



See appendix table 5-18.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Figure 5-7.
Blacks as a percentage of the science and engineering labor force, by occupation: 1995

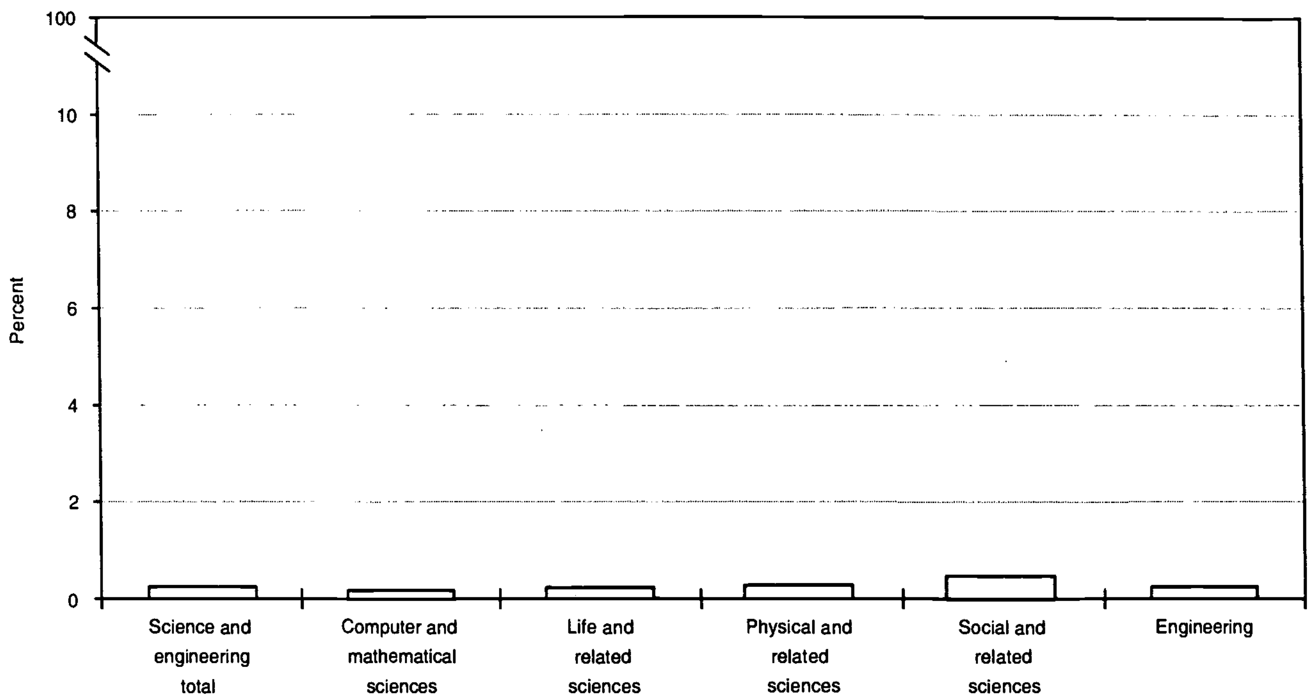


See appendix table 5-18.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Figure 5-8.

American Indians as a percentage of the science and engineering labor force, by occupation: 1995

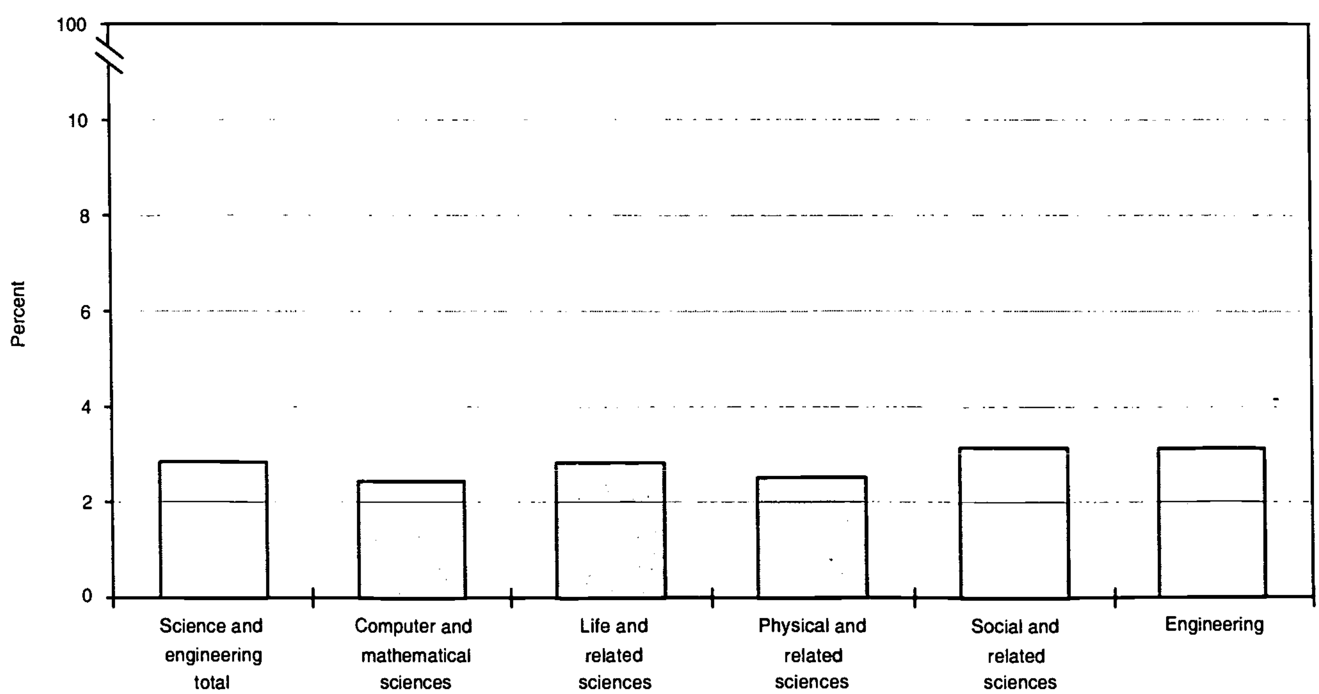


See appendix table 5-18.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Figure 5-9.

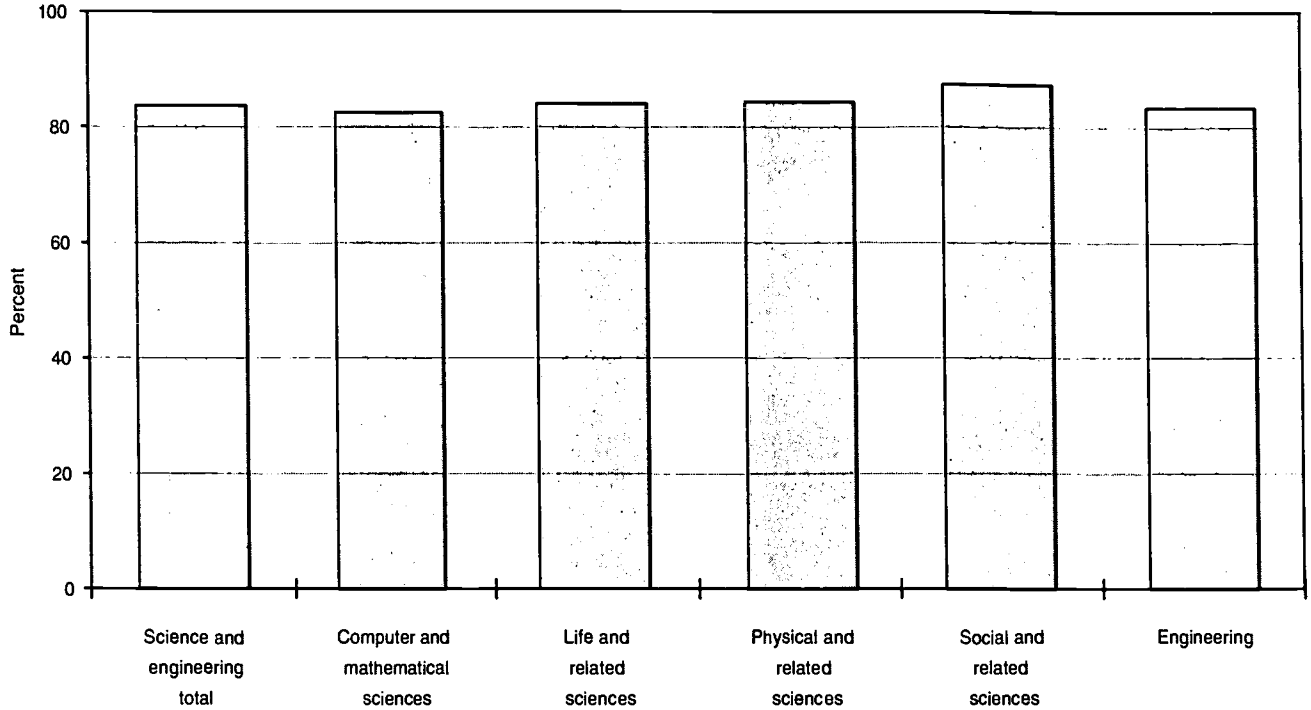
Hispanics as a percentage of the science and engineering labor force, by occupation: 1995



See appendix table 5-18.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Figure 5-10.
Whites as a percentage of the science and engineering labor force, by occupation: 1995



See appendix table 5-18.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

and engineers. Although the numbers are small, American Indians appear to be concentrated in the social sciences. They are 0.5 percent of social scientists and 0.3 percent or less of other fields. Hispanics are more proportionally represented among fields. They are roughly 2.5 to 3 percent of scientists and engineers in each field.

Distributions of field for racial/ethnic groups differ also by nativity. Among doctoral scientists and engineers, U.S.-born Asians are more similar to other racial/ethnic groups in terms of field than are non-U.S.-born Asians. (See text table 5-1.) Both U.S.-born and non-U.S.-born Asians are less likely than other racial/ethnic groups to be in social sciences and more likely to be in engineering; however, the differences are less among U.S.-born scientists and engineers. (See appendix table 5-19.)

Educational Background

The educational attainment of scientists and engineers differs among racial/ethnic groups. Black scientists and engineers have, on average, a lower level of educational attainment than scientists and engineers of other racial/ethnic groups. Black scientists and engineers are more likely than white, Hispanic, or Asian scientists and engineers to have a bachelor's as the terminal degree: 66 percent of black scientists and engineers in the U.S. labor force have a bachelor's as the highest degree compared to 58 percent of all scientists and engineers in 1995. (See appendix table 5-18.)

Labor Force Participation, Employment, and Unemployment

Labor force participation rates vary by race/ethnicity. Minority scientists and engineers were more likely than whites to be in the labor force (i.e., employed or looking for employment). Between 91 and 94 percent of black, Asian, Hispanic, and American Indian scientists and engineers were in the labor force in 1995, compared to 87 percent of white scientists and engineers. (See appendix table 5-20.) Age differences are part of the explanation. White scientists and engineers are older, on average, than scientists and engineers of other racial/ethnic groups: 22 percent of white scientists and engineers were age 50 or older in 1995, compared with between 15 and 18 percent of Asians, blacks, and Hispanics. (See appendix table 5-2.) Among those in similar age groups, the labor force participation rates of white and minority scientists and engineers are similar. (See appendix table 5-3.)

Text table 5-1.
Doctoral scientists and engineers in the labor force, by occupation and race/ethnicity: 1993

U.S.-born doctoral scientists and engineers:
[Percentage distribution]

Occupation	Total	White, non-Hispanic	Asian	Black, non-Hispanic	Hispanic	American Indian
Total, all fields	100.0	100.0	100.0	100.0	100.0	100.0
Computer and mathematics	11.6	11.6	9.5	12.7	10.0	9.2
Life sciences	24.7	24.8	32.1	19.2	22.7	17.0
Physical sciences	18.5	18.8	15.5	11.3	16.3	9.5
Social sciences	31.6	31.2	23.9	49.2	35.1	54.8
Engineering	13.6	13.6	19.0	7.6	16.0	9.4

Non-U.S.-born doctoral scientists and engineers:
[Percentage distribution]

Occupation	Total	White, non-Hispanic	Asian	Black, non-Hispanic	Hispanic	American Indian
Total, all fields	100.0	100.0	100.0	100.0	100.0	—
Computer and mathematics	16.5	17.0	16.2	12.7	15.4	—
Life sciences	24.0	24.2	23.5	21.0	29.8	—
Physical sciences	20.2	21.9	19.3	20.5	15.8	—
Social sciences	12.7	17.2	7.7	26.4	22.0	—
Engineering	26.6	19.7	33.3	19.3	17.0	—

See appendix table 5-19.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Although minorities, for the most part, are less likely to be out of the labor force, among those who are in the labor force, minorities are more likely to be unemployed. In 1995, the unemployment rate of white scientists and engineers was significantly lower than that of other racial/ethnic groups. (See appendix table 5-20.) The unemployment rate for whites was 2.0 percent, compared with 2.8 percent for Hispanics, 2.4 percent for blacks, and 3.4 percent for Asians. The differences in unemployment rates were evident within fields of science and engineering as well as for science and engineering as a whole. For example, the unemployment rate for white engineers was 2.5 percent; for black and Asian engineers, it was 4.0 percent.

Sector of Employment

Racial/ethnic groups differ in employment sector, partly because of differences in field of employment. Among employed scientists and engineers in 1995, 51 percent of black, 57 percent of Hispanic, and 54 percent of American Indian, compared with 62 percent of white and 64 percent of Asian scientists and engineers were employed in for-profit business or industry. (See appendix table 5-7.) Blacks and American Indians are concentrated in the social sciences, which are less likely to offer employment in business or industry, and are underrepresented in engineering, which is more likely to offer employment in business or industry. Asians, on the other hand, are overrepresented in engineering and thus are more likely to be employed by private for-profit employers.

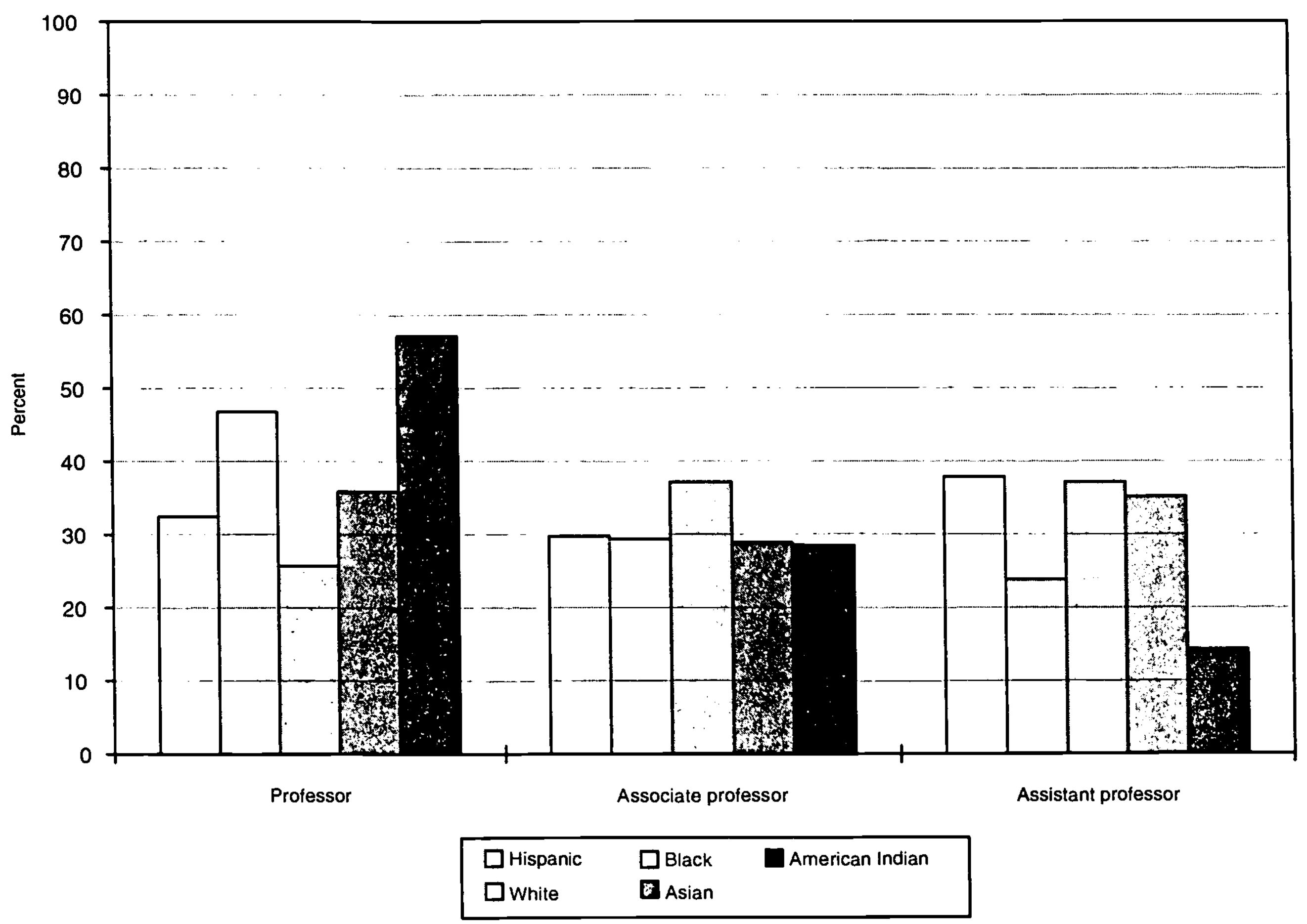
Black, Hispanic, and American Indian scientists and engineers are also more likely than other groups to be employed in government (Federal, state, or local): 22 percent of black, 17 percent of Hispanic, and 19 percent of American Indian scientists and engineers were employed in government in 1995, compared with 14 percent of white and 12 percent of Asian scientists and engineers.

Academic Employment

Racial/ethnic groups differ in academic employment characteristics such as rank and tenure. Minorities represented 15 percent of full-time ranked doctoral science and engineering faculty in 1995: blacks constituted 2.4 percent, Asians 9.2 percent, American Indians 0.5 percent, and Hispanics 2.7 percent. Although Asians are not underrepresented in science and engineering employment, like underrepresented minorities, they are less likely to be full professors. (See figure 5-11.) Among full-time ranked science and engineering faculty, 35 percent of Asians, 25 percent of blacks, and 31 percent of Hispanics, compared with 47 percent of whites, are full professors. These differences are largely explained by differences in age. Black, Hispanic, and Asian scientists and engineers are younger on average than white and American Indian scientists and engineers. When age differences are accounted for, most differences in rank and tenure are reduced. Among ranked faculty between the ages of 45 and 54, 50 percent of Hispanic faculty, 55 percent of Asian faculty and 59 percent of white faculty were full professors. (See appendix table 5-9.) Among black faculty in that age group, however, 25 percent were full professors.

Black, Hispanic, and Asian faculty are also less likely than white faculty to be tenured. Forty-seven percent of black faculty, 41 percent of Hispanic faculty, and 35 percent of Asian faculty compared to 57 percent of white faculty are tenured. (See appendix table 5-10.) Some, but not all, of these tenure differences are related to age differences. Among younger faculty (age 35 to 44), 29 percent of Hispanic, 21

Figure 5-11.
Academic rank of full-time employed ranked doctoral science and engineering faculty in 4-year colleges and universities, by race/ethnicity: 1995



See appendix table 5-9.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

percent of black, 25 percent of Asian, and 37 percent of white faculty are tenured.

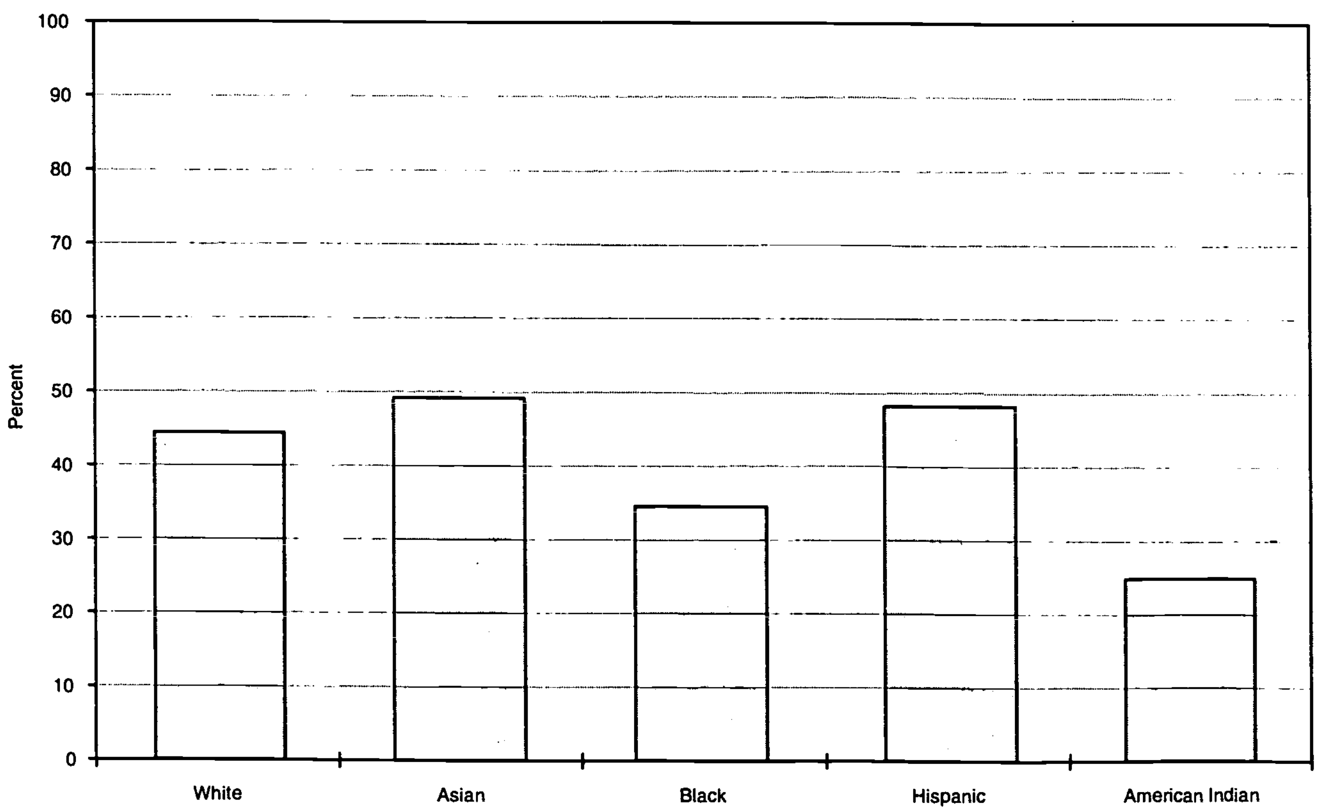
Black faculty had fewer publications than faculty in other racial/ethnic groups since 1990. (See appendix table 5-11.) Among doctoral scientists and engineers who received their doctorates in 1990 or earlier and who work in 4-year colleges or universities, 28 percent of black faculty had no publications since 1990 compared with 15 percent of Hispanic, 18 percent of white, and 12 percent of Asian faculty.

Black and American Indian faculty are also less likely than other groups to have received Federal grants or contracts. (See figure 5-12.) Thirty-five percent of black and 25 percent of American Indian doctoral scientists and engineers employed in colleges or universities are supported by Federal contracts or grants compared to 44 percent of white and 49 percent of Hispanic and Asian doctoral scientists and engineers employed full time in colleges or universities. (See appendix table 5-12.)

Nonacademic Employment

Racial/ethnic groups differ in some respects in their primary work activity. Black and Asian scientists and engineers are more likely than other groups to be engaged primarily in computer applications—34 percent of black and 36 percent of Asians compared with 27 percent of Hispanic and 28 percent of white scientists and engineers. (See appendix table 5-13.) Asians are less likely than other groups to be in management or administration (14 percent of Asians compared with roughly 22 percent of Hispanic, white, and black scientists and engineers). Age differences do not explain this difference in managerial activity. Among 35 to 44 year olds, Asians remain less likely to be in management—13 percent of Asians and between 20 and 23 percent of other groups are in management or administration. Among supervisory scientists and engineers, Asians also have fewer subordinates. The average number of direct and indirect subordinates is 8 for Asians,

Figure 5-12.
Percent of full-time employed doctoral scientists and engineers in 4-year colleges or universities who are supported by contracts or grants from the U.S. government, by race/ethnicity: 1995



See appendix table 5-12.

9 for American Indians, and roughly 11 for Hispanic, white, and black scientists and engineers. (See appendix table 5-14.)

White and Hispanic scientists and engineers work for similarly sized employers. Black and American Indian scientists and engineers are more likely to work for very large firms (55 percent and 54 percent, respectively) than are white scientists and engineers (45 percent). (See appendix table 5-15.)

Black scientists and engineers are less likely to have patents than other racial/ethnic groups. In business and industry among natural scientists and engineers who received degrees in 1990 or earlier, 17 percent of blacks, compared with 50 percent of Hispanics, 38 percent of whites, and 36 percent of Asians, were named as an inventor on a patent since 1990. (See appendix table 5-16.)

Salaries

Salaries for scientists and engineers differ little among racial/ethnic groups. Among all scientists and engineers, the median salaries by racial/ethnic group are $50,500 for whites, $50,000 for Asians, $45,000 for blacks, $47,000 for Hispanics, and $48,000 for American Indians, with the biggest differences being between whites and blacks. Within fields and age categories, median salaries of scientists and engineers by race/ethnicity are not dramatically different and do not follow a consistent pattern. (See appendix table 5-21.) For example, the median salary of engineers with bachelor's degrees who are between the ages of 20 and 29 ranges from $36,000 for American Indians to $40,000 for blacks. Among those between the ages of 40 and 49, the median salary ranges from $53,000 for Asians and Hispanics to $58,000 for whites.

Minority Women

Representation in Science and Engineering

Minority women are 19 percent of all women in the science and engineering labor force and 4.2 percent of all scientists and engineers in the labor force. (See text table 1-1 and appendix table 5-22.) Black women are 1.3 percent, Hispanic women are 0.6 percent, American Indian women are 0.1 percent, and Asian women are 2.2 percent of scientists and engineers in the labor force. Within every racial/ethnic group, women are a smaller proportion of the science and engineering labor force than are men.

Field of Science and Engineering

Field choices of minority women are more similar to those of white women than they are to those of minority men. Higher proportions of women than men within each racial/ethnic group are in computer or mathematical sciences, life sciences, and social sciences and lower proportions are in engineering. Asian women differ from women in other racial/ethnic groups in that a relatively small proportion are in social sciences. (See appendix table 5-22.)

Labor Force Participation, Employment, and Unemployment

Black and Asian women scientists and engineers are more likely than women from other racial/ethnic groups to be in the labor force and to be employed full time in a field related to their degree. Seventy-one percent of black and 72 percent of Asian women scientists and engineers compared with 61 percent of white women, 68 percent of Hispanic women, and 65 percent of American Indian women were employed full time in their field. (See appendix table 5-23.) Conversely, more white women (15 percent) than black women (9 percent) and Asian women (7 percent) are employed part time.

The unemployment rate for white women scientists and engineers is much lower than is the case for other racial/ethnic groups: 1.8 percent compared with 2.3 percent for Hispanic women, 2.7 percent for black women, and 3.0 percent for Asian women.

Sector of Employment

Academic Employment

As previously discussed, men and women and racial/ethnic groups differ in academic employment characteristics, such as rank and tenure. Women are less likely than men to be full professors, and minority faculty are less likely than white faculty to be full professors. Minority women are less likely than white women and less likely than men of any racial/ethnic group[11] to be full professors. (See appendix table 5-24.) As in other cases, these rank and tenure differences may be related to age differences.

Tenure differences may also be related to rank. Minority women are less likely than white women or men of any racial/ethnic group to be tenured. Twenty-five percent of Hispanic women, 36 percent of black women, and 17 percent of Asian women compared to 38 percent of white women, 62 percent of white men, and between 39 and 50 percent of Hispanic, black and Asian men are tenured. (See appendix table 5-25.) The small percentage of Asian women who are tenured is also related to differences in academic position. A relatively larger proportion of Asian men and women are in positions for which tenure does not apply, for example, postdoctoral fellows and nonfaculty research appointments.

[11] Excluding American Indians for whom data are unreliable due to small sample size.

Nonacademic Employment

Minority women scientists and engineers in business or industry have, for the most part, similar work activities as white women and minority men. For example, from 26 to 34 percent of women in most racial/ethnic groups are primarily engaged in research, and from 17 to 21 percent of women in most racial/ethnic groups are in management or administration (the exception being 13 percent of Asian women in management). (See appendix table 5-26.) Women, regardless of racial/ethnic group, are more likely than men to work in computer applications and are less likely than men to work in research and development.

Salaries

Median annual salaries of minority women are similar to those of both white women and minority men, controlling for field and age. Among engineers in the 20- to 29-year-old age group, for example, the median salary of Hispanic women was $40,000, for black women $42,000, for Asian women $37,700, and for white women $38,800. Median salaries for men engineers in the same age group ranged from $38,000 to $40,000. (See appendix table 5-27.)

Scientists and Engineers With Disabilities

Representation in Science and Engineering

Persons with disabilities are also underrepresented in science and engineering occupations. Comparisons of data on participation of persons with disabilities are difficult because of differences in definition.[12] It appears, however, that persons with disabilities are a smaller proportion of the science and engineering labor force than they are of the labor force in general. About 20 percent of the U.S. population have some form of disability, and about 10 percent have a severe disability[13] (McNeil, 1993). Persons with disabilities are 14 percent of all employed persons[14] and 5 percent of employed scientists and engineers. (See text table 1-1 and appendix table 5-7.)

The representation of persons with disabilities in the science and engineering population can be estimated by comparing the results of the NSF SESTAT surveys with similar results from the Bureau of the Census Survey of Income and Program Participation (SIPP).[15] The 1993–1994 SIPP used

[12] The data on persons with disabilities in science and engineering are seriously limited for several reasons. First, there have been differing operational definitions of "disability" that include a wide range of physical and mental conditions. Different sets of data have used different definitions and thus are not totally comparable. Second, data about disabilities are frequently not included in comprehensive institutional records (e.g., in registrars' records in institutions of higher education). The third limitation on information on persons with disabilities gathered from surveys is that it often is obtained from self-reported responses. Typically, respondents are asked if they have a disability and to specify what kind of disability it is. Resulting data, therefore, reflect individual decisions to self-identify, not objective measures. Finally, data users should understand that sample sizes for the population of disabled persons may be small and care should be taken in interpreting the data.

[13] Estimates of the proportion of the population with disabilities vary due to differing definitions of "disability." See appendix A for a discussion of the limitations of estimates of the size of this group.

[14] U.S. Department of Commerce, Bureau of the Census. 1994. "Americans with Disabilities" Statistical Brief SB/94-1.

[15] Since there were several differences between the two surveys, comparisons can be made only for certain segments of the two populations.

Measuring Disabilities for Persons in the Labor Force

As noted in chapter 1, there is no consensus on the definition of disabilities. This means that in examining statistics related to disabilities, it is necessary to understand the definition used in compiling the statistics.

NSF's surveys use a functional definition of disability patterned after one developed for a planned survey of individuals with disabilities developed by the Census Bureau. This measure is based on asking individuals, "What is the USUAL degree of difficulty you have with [specific tasks involving seeing, hearing, walking, and lifting]?"[16] Respondents are given five choices for each response, ranging from "none" to "unable to do." Unless elsewhere noted, having a disability is defined for this survey as having at least moderate difficulty in performing one or more of these tasks. Although this definition was designed to provide a relatively objective measure of disability, it is important to note that not all disabilities are captured by this measure. For example, learning disabilities and behavioral disorders are not included.[17]

[16] The full wording of these alternatives in the survey forms is "SEEING words or letters in ordinary newsprint (with glasses/contact lenses if you usually wear them)," "HEARING what is normally said in conversation with another person (with hearing aid, if you usually wear one)," "WALKING without assistance (human or mechanical) or using stairs," "LIFTING or carrying something as heavy as 10 pounds, such as a bag of groceries."

[17] Additional measures of types of disability were omitted from the surveys due to practical limitations. The disability questions included in the questionnaires were considered burdensome and intrusive by many respondents. The survey designers were concerned that additional questions in this area would have a serious negative impact on the overall response rate and the validity of the surveys. This would be especially true if the surveys requested information on highly sensitive disabilities.

questions for measuring disability that are quite similar to those in the NSF surveys (McNeil, 1993). This provides an opportunity to make some approximate comparisons between the science and engineering population and the larger population.

Comparisons of the two survey results indicate that persons with sight and hearing disabilities are not underrepresented and persons with mobility impairments are underrepresented among scientists and engineers. The Survey of Income and Program Participation found that in 1994–1995, 2.4 percent of the population of 15 to 64 years olds reported that they were unable to see words and letters even when wearing glasses or contact lenses. The comparable figure from the 1995 NSF Surveys was 2.3 percent. In the total population, 2.7 percent were unable to hear normal conversations even when using a hearing aid, compared with 3.0 percent of the scientists and engineers. On the other hand, 4.8 percent of the general population reported being unable to lift a 10-pound bag of groceries, compared with 1.6 percent of the scientists and engineers. Of the total population, 5.2 percent were unable to walk unassisted or climb stairs compared with 1.4 percent of the scientists and engineers. (See appendix table 5-28.)[18 19]

Age Distribution

The proportion of scientists and engineers with disabilities increases with age. More than half became disabled at age 30 or older. (See figure 5-13.) Only 7 percent had been disabled since birth, and 30 percent had been disabled before the age of 20. (See appendix table 5-29.)

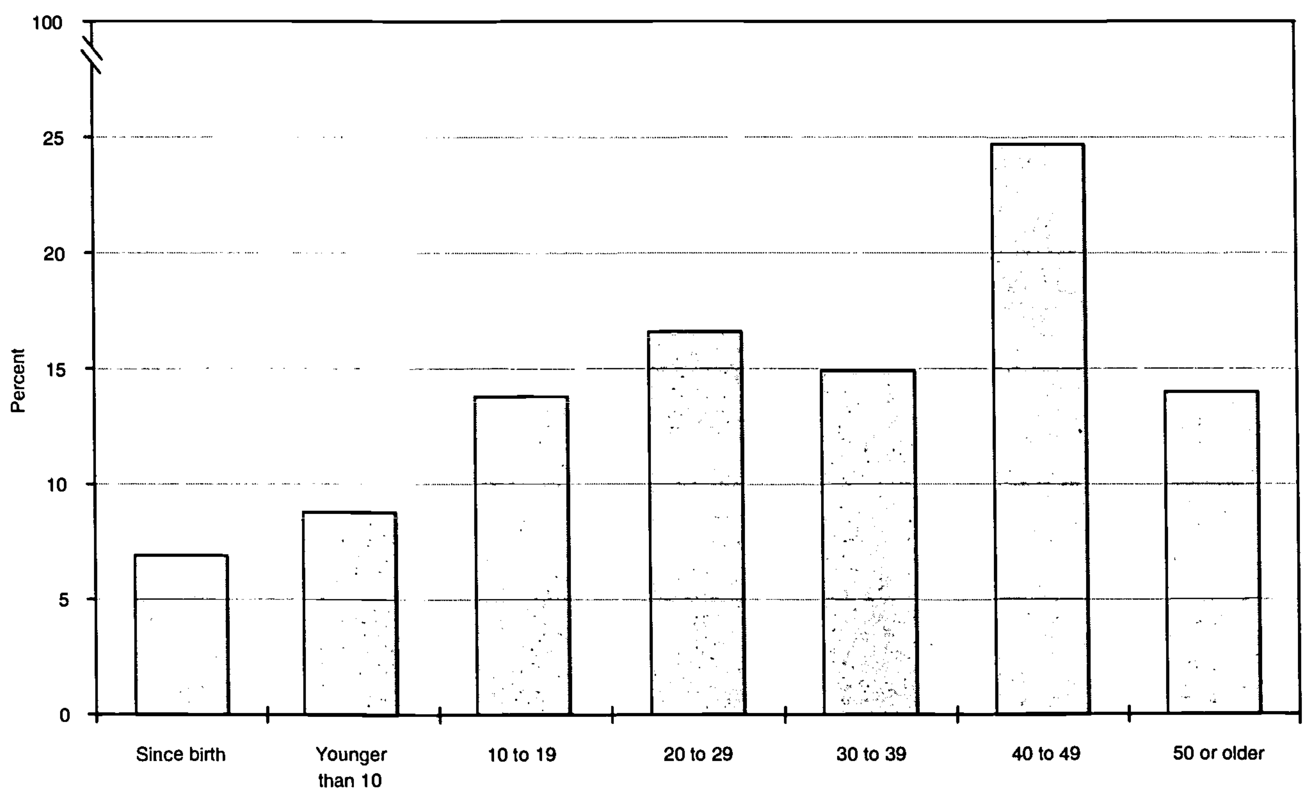
Labor Force Participation, Employment, and Unemployment

The labor force participation rates of scientists and engineers with and without disabilities are quite different. Almost one-third of scientists and engineers

[18] The question used in the SESTAT surveys combined stair climbing and walking, whereas the Survey of Income and Program participation asked about these two activities separately. The rate reported for the latter survey is for the activity with the higher reported disability rate.

[19] Small cell sizes restrict the analysis of types of disability to overall percentages of the science and engineering population.

Figure 5-13.
Percent of scientists and engineers with disabilities who are in the labor force, by age at onset of disability: 1995



See appendix table 5-29.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

BEST COPY AVAILABLE

with disabilities are out of the labor force, compared with 11 percent of those without disabilities. (See appendix table 5-30 and figure 5-14.) Age accounts for some, but not all, of the differences in labor force participation. Scientists and engineers with disabilities are older than those without disabilities (40 percent of those with disabilities are age 50 or older compared with 20 percent of those without disabilities), and older scientists and engineers are likely to be out of the labor force due to retirements. Age, however, does not explain all of the differences in labor force participation. Within age categories, scientists and engineers with disabilities are still more likely than those without disabilities to be out of the labor force. For example, among those between the ages of 35 and 44, 7 percent of scientists and engineers with disabilities are unemployed or out of the labor force compared with 4 percent of those without disabilities. Among those age 55 or older, 61 percent of scientists and engineers with disabilities are out of the labor force compared with 42 percent of those without disabilities.

Although age accounts for some of the tendency for persons with disabilities to be out of the labor force, chronic illness or permanent disability is also a factor. The primary reason for not working for both persons with and without disabilities was retirement (75 percent versus 60 percent), but 21 percent of persons with disabilities and 2 percent of those without disabilities cited chronic illness or permanent disability. (See appendix table 5-4.)

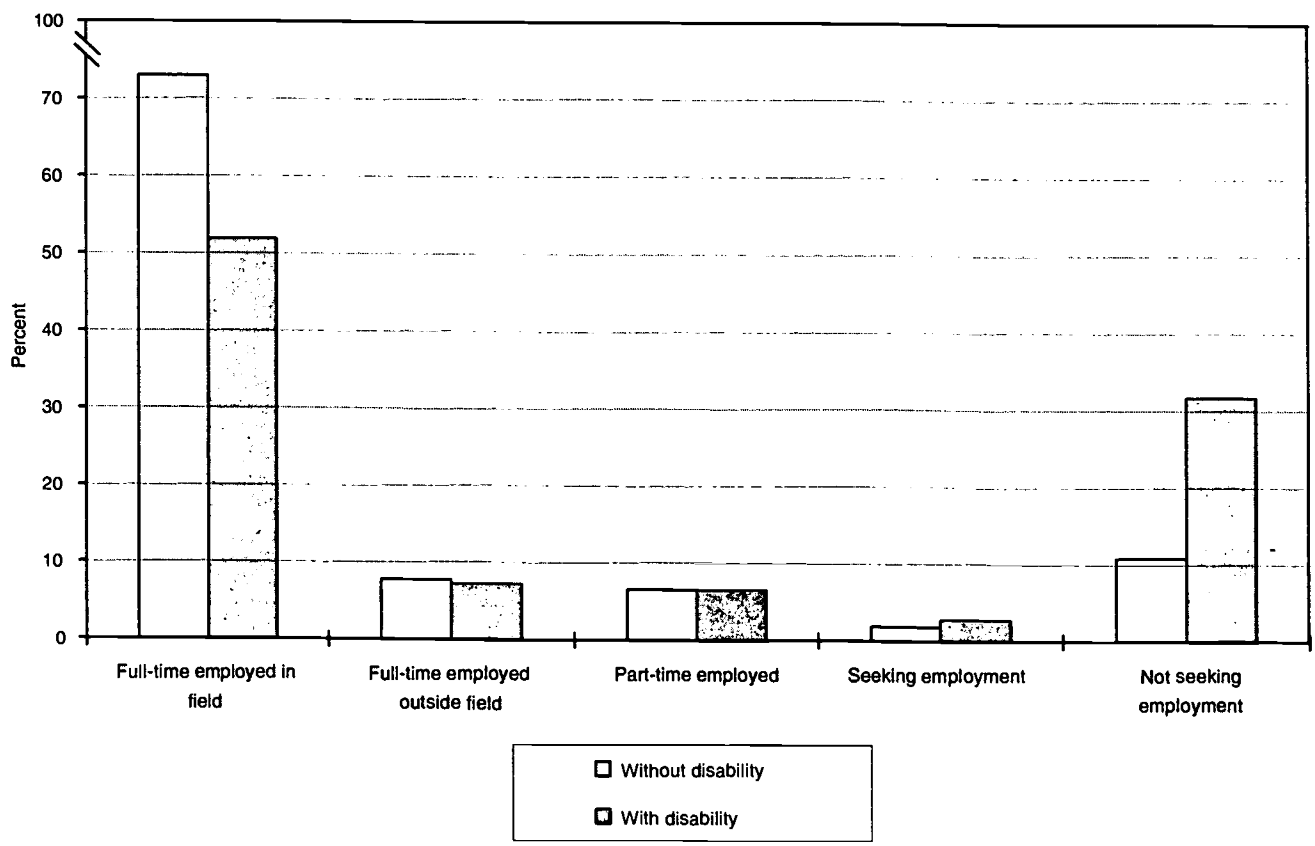
Among those in the labor force, persons with disabilities are more likely than those without disabilities to be unemployed. The 1995 unemployment rate for scientists and engineers with disabilities was 4.0 percent compared to 2.1 percent for those without disabilities. (See appendix table 5-30.)

The percentage of scientists and engineers in the labor force who were employed part time in 1995 was the same for those with and without disabilities (6 percent).

Field of Science and Engineering

Persons with disabilities are not particularly concentrated in certain fields: 30 percent of scientists and

Figure 5-14.
Employment status of scientists and engineers by disability status: 1995



See appendix table 5-30.

Misconceptions Can Limit Job Opportunities

Misconceptions about the ability of those with physical or learning disabilities to succeed in science and engineering persist. These misconceptions deter many young people with disabilities from pursuing careers in science and engineering and can limit the job opportunities for both those who obtain degrees in science and engineering and those who develop disabilities later in life (Woods, 1997). Young people can be discouraged by parents, teachers, and others from pursuing careers in science. As one working chemist with limited vision recalls, "Nobody wanted me to be a chemist...everyone thought it was crazy for a kid, almost blind, to major in chemistry. I had to fight my parents, the school, teachers, guidance counselors, and the state vocational rehabilitation agency" (p. 9). Safety is often the primary concern of parents, teachers, and employers, yet with proper training and accommodations, scientists and engineers with disabilities present no more of a safety hazard than those without disabilities.

According to the American Chemical Society's Committee on Chemists with Disabilities, not all chemists with disabilities require accommodations, and many of those who do require few accommodations, most of which are not costly. For example, making an emergency shower wheelchair accessible can simply require adding a chain. In interviews with a number of working chemists with disabilities, the committee found that the accommodations needed varied depending on the nature of the work and the nature of the disability. Decisions on what accommodations are needed were arrived at jointly between the employee and the employer or the student and the university.

Accommodations used by working chemists varied from simple and common procedures and technologies to more high-tech equipment. Some are as simple as allowing the scientist to work at home; planning in advance; providing simple encouragement and patience while a disabled colleague finds ways to adapt; providing flexible work hours; having access to computers, e-mail, voicemail, and faxes; and making adjustments in height of equipment, desks, valves, switches, ramps, or platforms. Some involve more complicated but nevertheless commonly available technology, such as voice recognition software, TTD, visual alarms, voice-synthesizer cards for computers, and printers that output Braille.

The committee found that attitudes are often the most important accommodation—a focus by both the employee and the employer on what they can rather than what they cannot do.

engineers both with and without disabilities were in computer science and mathematics occupations and 9 percent of both were in physical sciences. (See appendix table 5-31.) Similar proportions of scientists and engineers with and without disabilities were in engineering (41 percent versus 42 percent), in life sciences (8 percent versus 10 percent), and in social sciences (12 percent versus 10 percent).

Educational Background

Scientists and engineers with disabilities do not differ in educational background from those without disabilities: 13 percent of both have the doctorate as their highest degree. (See appendix table 5-31.)

Sector of Employment

Scientists and engineers with disabilities are less likely than those without disabilities to be employed in for-profit business or industry. Fifty-five percent of scientists and engineers with disabilities compared with 62 percent of those without disabilities were employed in for-profit business or industry in 1995. Eighteen percent of those without disabilities and 19 percent of those with disabilities are employed in educational institutions. (See appendix table 5-7.)

Academic Employment

Faculty who have disabilities are more likely than those without disabilities to be full professors and to be tenured. (See appendix tables 5-9 and 5-10.) These differences in rank and tenure between persons with or without disabilities, as was noted in the discussions of women and minorities, can be explained by differences in age. Because incidence of disability increases with age, scientists and engineers with disabilities tend to be older and to have greater years of professional work experience than those without disabilities. Among doctoral scientists and engineers employed full time in 4-year colleges or universities of similar ages, rank and tenure status are more similar. For example, among those between 45 and 54 years old, 70 percent of those with disabilities and 73 percent of those without disabilities are tenured. (See appendix table 5-10.) Similarly, among those in that same age group, 57 percent

of faculty both with and without disabilities are full professors.

Science and engineering faculty with disabilities are less likely to have publications than those without disabilities. Twenty-two percent of those with disabilities and 17 percent of those without disabilities had no publications since 1990. (See appendix table 5-11.) Faculty with disabilities had fewer publications than those without disabilities—43 percent of those with disabilities and 46 percent of those without disabilities had 6 or more publications since 1990. Faculty with disabilities (38 percent) were also less likely than those without disabilities (45 percent) to have been supported on federal grants or contracts. (See appendix table 5-12.)

Nonacademic Employment

The type of work that scientists and engineers with disabilities do is similar to the type of work done by those without disabilities. The primary work activity of 37 percent of scientists and engineers with disabilities is research and development, compared to 38 percent of those without disabilities. Twenty-five percent of scientists and engineers with disabilities and 21 percent of those without disabilities are in management or administration. (See appendix table 5-13.) Among those with supervisory responsibilities, persons with and without disabilities have about the same number of subordinates. The average number of subordinates for persons with disabilities is 12 and the average number of subordinates for persons without disabilities is 11. (See appendix table 5-14.)

Persons with disabilities do not differ from those without disabilities in terms of employer size—45 percent of those without disabilities and 46 percent of those with disabilities work for large firms (5,000 or more employees). Four percent of both work for very small firms (fewer than 10 employees). (See appendix table 5-15.)

Natural scientists and engineers with disabilities were less likely than those without disabilities to have patents—32 percent of those with disabilities and 38 percent of those without disabilities had been named as an inventor on a patent since 1990. (See appendix table 5-16.)

Salaries

Median salaries of scientists and engineers with disabilities do not differ substantially from median salaries for those without disabilities. Among all scientists and engineers, the median salary for those with disabilities is $51,000; for those without disabilities, it is $50,000. Salaries differ little within fields and age groups as well. For example, the median salary for engineers with bachelor's degrees and between the ages of 20 and 29 is $41,000 for those with disabilities and $38,000 for those without disabilities. Among those age 50 or older, the median salary for engineers with disabilities is $60,000 and the median salary for engineers without disabilities is $61,000. (See appendix table 5-32.)

References

Fox, Mary Frank, and Paula E. Stephan. 1996. "Careers in Science: Preferences, Prospects, Realities" presentation at a conference on "Science Careers, Gender Equity, and the Changing Economy" co-sponsored by the Commission on Professionals in Science and Technology and Radcliffe Public Policy Institute, October 1996.

Garfield, E. 1993. Women in Science. Part 1: The Productivity Puzzle—J. Scott Long on Why Women Biochemists Publish Less Than Men. *Current Comments*, 9 (1 March), 3–5.

Long, J.S. 1992. Measures of Sex Differences in Scientific Productivity. *Social Forces*, 71, 159–178.

Maxfield, Betty, Nancy Ahearn, and Andrew Spisak. 1976. *Employment Status of Ph.D. Scientists and Engineers 1973 and 1975*. Washington, DC: Commission on Human Resources, National Academy of Sciences.

McNeil, John M. 1993. *Americans With Disabilities: 1991–92: Data from the Survey of Income and Program Participation*. Bureau of the Census, Current Population Reports, P70-33. Washington, DC: U.S. Department of Commerce.

National Science Foundation. 1994. *Women, Minorities, and Persons With Disabilities in Science and Engineering: 1994* (NSF 94-333). Arlington, VA: National Science Foundation.

National Science Foundation. 1996. *Women, Minorities, and Persons With Disabilities in Science and Engineering: 1996* (NSF 96-311). Arlington, VA: National Science Foundation.

National Science Foundation. 1997. *Who is Unemployed? Factors Affecting Unemployment among Individuals with Doctoral Degrees in Science and Engineering* (NSF 97-336). Arlington, VA: National Science Foundation.

Sonnert, Gerhard with the assistance of Gerald Holton. 1995a. *Who Succeeds in Science?: The Gender Dimension*. New Brunswick, NJ: Rutgers University Press.

Sonnert, Gerhard with the assistance of Gerald Holton. 1995b. *Gender Differences in Science Careers: The Project Access Study.* ASA Rose Book Series. New Brunswick, NJ: Rutgers University Press.

U.S. Department of Labor, Bureau of Labor Statistics. 1994. *Report on the American Workforce.* Current Population Survey (downloaded data, special tabulations, and information). Washington, DC: U.S. Department of Labor.

Woods, Michael, 1997. *Working Chemists With Disabilities,* Washington, DC: American Chemical Society.

Appendix A

Technical Notes

General Information

The data in this report come from many sources, including surveys conducted by NSF, other Federal agencies and by non-Federal sources. The data reflect many methods of collection, such as universe surveys, sample surveys, and compilations of administrative records. Users should take great care when comparing data from different sources. Data often will not be strictly comparable due to differences in definitions, survey procedures, phrasing of questions, and so forth.

Survey accuracy is determined by the joint effects of "sampling" and "nonsampling" errors. Sampling errors arise because estimates based on a sample will differ from the figures that would have been obtained if a complete census had been taken.

All surveys, whether universe or sample, are also subject to nonsampling errors, which can arise from design, reporting, and processing errors as well as errors due to faulty response or nonresponse. These nonsampling errors include respondent-based events, such as some respondents interpreting questions differently from other respondents; respondents making estimates rather than giving actual data; and respondents being unable or unwilling to provide complete, correct information. Errors can also arise during the processing of responses, such as recording and keying errors.

Racial/Ethnic Information

Data collection and reporting of the race/ethnicity of individuals pose several additional problems. First, both the naming of population subgroups and their definitions have often changed over time. Because this report draws on data from many sources, different terminology may have been used to obtain the various statistics presented here. Efforts have been made to maintain consistency throughout this text, but in some data reporting, it has been necessary to use distinct terminology that does not match other compilations.

Second, many of the groups of particular interest are quite small, so that it is difficult to measure them [illegible]ately without universe surveys. In some instances sample surveys may not have been of sufficient scope to permit calculation of reliable racial/ethnic population estimates, so that results are not shown for all groups. In addition, the reader is cautioned that it is easy to overlook or minimize the heterogeneity within subgroups when only a single statistic is reported for the total racial/ethnic group.

Information About Persons With Disabilities

The data on persons with disabilities in science and engineering are seriously limited for several reasons. First, the operational definitions of "disability" vary and include a wide range of physical and mental conditions. Different sets of data have used different definitions and thus are not totally comparable. The Americans with Disabilities Act of 1990 (ADA) encouraged progress toward standard definitions. Under the ADA, an individual is considered to have a disability if the person has a physical or mental impairment that substantially limits one or more of the major life activities, has a record of such impairment, or is regarded as having such an impairment. The ADA also contains definitions of specific disabilities. (See Chapter 2, p. 22.)

Second, data about disabilities frequently are not included in comprehensive institutional records (e.g., in registrars' records in institutions of higher education). If included at all in institutional records, such information is likely to be kept only in confidential files at an office responsible for providing special services to students. Institutions are unlikely to have information regarding any persons with disabilities who have not requested special services. In the case of elementary/secondary school programs receiving funds to provide special education, however, counts for the entire student population identified as having special needs are centrally available.

The third limitation on information on persons with disabilities gathered from surveys is that it often is obtained from self-reported responses. Typically, respondents are asked if they have a disability and to specify

what kind of disability it is. Resulting data, therefore, reflect individual perceptions, not objective measures.

Finally, data on persons with disabilities are often derived from sample surveys whose main purpose is to derive estimates for a full population. Deriving estimates for any phenomenon that is applicable to a small proportion of the total is particularly difficult, especially when the sampling procedures do not have a way to "oversample" cases providing the characteristic of interest. Because persons with disabilities constitute a relatively small portion of the population and because oversampling is not possible, sample sizes may not be sufficiently large to permit calculation of reliable estimates.

An example in which these factors come together can be seen in the attempt to provide estimates of the proportion of the undergraduate student population with disabilities. Self-reported data from the undergraduate student population, queried on a survey to ascertain patterns of student financial aid, suggest that about 10 percent of the undergraduate population report having some disability; estimates from population surveys of higher education institutions, in contrast, place the estimate much lower, between 1 and 5 percent. Whether this discrepancy is the result of self-perception, incomplete reporting, nonevident disabilities, or differing definitions is difficult to ascertain.

Therefore, although considerable information is available on persons with disabilities and their status in the educational system and in the science and engineering workforce, it is often not possible to compare the numbers of persons with disabilities from different sources.

Primary Non-NSF Sources

The following non-NSF sources were used for data tables in this report.

Survey of Income and Program Participation

Contact:
Current Population Reports
Bureau of the Census
U.S. Department of Commerce
Washington, DC 20233
Tel: (301) 763-8300

The Survey of Income and Program Participation conducted by the Census Bureau provides information on the economic situation of households and persons in the United States. The survey collects data on basic social and demographic characteristics of persons in households, labor force activity, type and amount of income, participation status in various programs, and various supplementary modules, for example, work history, health characteristics (including disability), assets and liabilities, and education and training.

A combined sample from the 1992 and 1993 panels of the Survey of Income and Program Participation provides the latest available data on the disability status of the noninstitutionalized population of the United States. A supplement containing an extensive set of questions about disability status was included as part of the ninth wave of the 1992 panel and the sixth wave of the 1993 panel. Both of these waves were fielded between September and December 1994. The total sample size for this study was approximately 40,000 interviewed households.

The disability supplements that have been asked in SIPP were designed to be consistent with the ADA definition of disability. The supplements obtain information on the ability to perform specific functional activities (seeing, hearing, having one's speech understood, lifting and carrying, climbing stairs, and walking); certain ADLs or activities of daily living (getting around inside the home, getting in and out of a bed or chair, bathing, dressing, eating, and toileting), and certain IADLs or instrumental activities of daily living (going outside the home, keeping track of money and bills, preparing meals, doing housework, and using the telephone). The survey also collects information on the use of such special aids as wheelchairs and canes, the presence of certain conditions related to mental functioning, and the ability to work at a job or business.

National Assessment of Educational Progress

Contact:
National Center for Education Statistics
U.S. Department of Education
555 New Jersey Avenue, NW
Washington, DC 20208-5653
Tel: (202) 219-1761

The National Assessment of Educational Progress (NAEP) is sponsored by the National Center for Education Statistics (NCES) and has been conducted since 1983 by the Educational Testing Service. The overall goal of the project is to determine the Nation's progress in education. Accordingly, NAEP encompasses a series of national sample surveys designed to assess students in 10 subject areas such as reading, mathematics, science, writing, and history. Begun in 1969, NAEP was conducted annually through 1980; since 1980 the project has been conducted biennially. NAEP has surveyed the educational accomplishments of 9-, 13-, and 17-year-old students (and, in recent years, those in grades 4, 8, and 12 as well).

Since 1986, NAEP has included both main and long-term trend assessments. Both assessments use a

complex multistage stratified sample of schools that are selected to ensure adequate representation of schools with high enrollment of blacks and Hispanics. Both assessments historically excluded students with limited English proficiency and students receiving special education services whom school officials judged unable to respond meaningfully to the assessment either because the students had limited English proficiency or because they had a severe mental or physical disability.

Beginning with NAEP assessments in 1996, attempts were made to have more of the students who were classified as having disabilities or limited English proficiency included in the assessment. Accommodations were implemented for students who would have been excluded in the past. Spanish-speaking students classified as Limited English Proficiency were given the option of using a bilingual test booklet in mathematics in a portion of the sample. In addition, English-Spanish glossaries were provided at all three grades for designated science books. Other accommodations (such as earphones for the hearing impaired, signers for the deaf, magnifying equipment, and translators) were allowed if provided by the school and specified in the student's Individual Education Plan. A study to determine the impact of the revised inclusion rules and accommodations is taking place with the 1996 assessment. Students classified as disabled or with limited English proficiency who cannot be accommodated, either by the administrators of NAEP or by the schools, are excluded from the assessment.

The main assessments estimate student achievement at a cross-sectional point in time. The cross-sectional samples use innovations in assessment methodology and population definition. In 1996, data were collected from approximately 35,000 students in grades 4, 8, and 12 for the science assessments and from approximately 33,000 students in grades 4, 8, and 12 for the mathematics assessments. Data were also collected from these students' principals and a sample of their teachers.

The long-term trend assessments estimate the current status of achievement using the same sampling and assessment methodology used in previous years. In 1996, approximately 15,000 students ages 9, 13, and 17 were tested in mathematics and in science.

Performance data are reported for the Nation, and for various subgroups categorized by such variables as region, gender, race/ethnicity, parental education, type of school, and type and size of community. Also initiated in 1983 was the reporting of performance data by scaled proficiency levels. Beginning with the 1990 assessment, National Assessment Governing Board established three reporting levels for reporting NAEP results: basic, proficient, and advanced. Currently, NAEP is conducted every other year in even-numbered years.

American College Testing Program

Contact:
The American College Testing Program
2201 North Dodge Street
P.O. Box 168
Iowa City, IA 52243
Tel: (319) 337-1510

The American College Testing (ACT) Assessment is taken by college-bound high school students who request that the results be sent to designated colleges and scholarship boards. The ACT is designed to measure educational development in the areas of English, mathematics, social studies, and natural sciences. The test results are used in part to help predict how well students might perform in college. In 1994, approximately 892,000 students took the ACT examinations.

ACT standard scores are reported for each subject area on a scale from 1 to 36. A composite score is obtained by taking the simple average of the four standard scores and is an indication of a student's overall academic development across the four subject areas.

Since the 1984–1985 school year, national norms have been based on the most recent ACT test scores available from all students taking the test and who are scheduled to graduate in the spring of the year.

It should be noted that college-bound students who take the ACT Assessment are not, in some respects, representative of college-bound students nationally. First, students who live in the Midwest, South, Rocky Mountains, and Plains regions are overrepresented among ACT-tested students compared with college-bound students nationally. Second, ACT-tested students tend to enroll in public colleges and universities more frequently than do college-bound students nationally.

Scholastic Assessment Test (SAT)

Contact:
College Entrance Examination Board
Educational Testing Service
Princeton, NJ 08541
Tel: (609) 771-7600

The Admissions Testing Program of the College Board comprises a number of college admissions tests, including the Scholastic Assessment Test (SAT). The SAT is taken by students who need the results to apply to a particular college or university or scholarship board. High school students participate in the testing program as sophomores, juniors, or seniors—some more than once during these 3 years. If they have taken the tests more than once, only the most recent scores are tabulated.

The SAT reports subscores in the areas of mathematics and verbal ability. Students may also elect to take Achievement Tests in any of 21 subject areas; these exams are generally taken by students who are applying to the more competitive schools. In 1994, approximately 1.1 million students took the SAT examination, and more than 200,000 took at least one Achievement Test.

In 1987 the College Board initiated a review of the Admissions Testing Program and made significant changes in the SAT Program in 1993–1994. Through the January 1994 test administration, SAT Program tests included the SAT, the Test of Standard Written English (TSWE), and the Achievement Tests. Beginning in March 1994, the SAT Program was revised into two formats: the SAT I: Reasoning Test (the mathematical and verbal sections, with revisions beginning in March 1994) and SAT II: Subject Tests (formerly known as the Achievement Tests, with the revisions beginning in May 1994).

The SAT results are not representative of high school students or college-bound students nationally since the sample is self-selected. In addition, public colleges in a number of states require that students applying for admission submit ACT scores rather than SAT scores; thus, the proportion of students taking the SAT in some states is very low.

The Integrated Postsecondary Education Data System Survey: Fall Enrollment, Completions and Institutional Characteristics

Contact:
National Center for Education Statistics
U.S. Department of Education
555 New Jersey Avenue, NW
Washington, DC 20208-5652
Tel: (202) 219-1373

The Integrated Postsecondary Education Data System (IPEDS) began in 1986 as a supplement to and replacement for the Higher Education General Information Survey (HEGIS), which began in 1966. HEGIS was an annual survey of institutions listed in the current NCES *Education Directory of Colleges and Universities*; IPEDS surveys all postsecondary institutions, including universities and colleges and the institutions that offer technical and vocational education. The higher education portion is a census of accredited 2- and 4-year colleges, whereas technical and vocational schools are surveyed on a sample basis.

IPEDS consists of several integrated components that obtain information on types of institutions where postsecondary education is available, student participants, programs offered and completed, and the human and financial resources involved in the delivery of postsecondary education. The components of IPEDS include surveys of institutional characteristics; fall enrollment of students, including their age and residence; fall enrollment in occupationally specific programs; completions; finance; staff; salaries of full-time instructional faculty; and academic libraries.

The IPEDS Institutional Characteristics Survey provides the basis for the universe of institutions reported in the *Education Directory of Colleges and Universities*. The universe includes institutions that met certain accreditation criteria and offered at least a 1-year program of college-level studies leading toward a degree. Each fall, institutions listed in the previous year's directory are asked to update information on the characteristics of their schools.

The IPEDS Completions Survey replaces and extends the HEGIS Degrees and Other Formal Awards Conferred Survey. The Completions Survey is administered to a census of institutions offering degrees at the bachelor's level and above, all 2-year institutions, and a sample of less-than-2-year institutions.

The IPEDS Fall Enrollment Survey replaces and extends the previous HEGIS surveys of institutions of higher education.

The National Postsecondary Student Aid Survey

Contact:
National Center for Education Statistics
U.S. Department of Education
555 New Jersey Avenue, NW
Washington, DC 20208-5652
Tel: (202) 219-1839

The National Postsecondary Student Aid Study (NPSAS) was established by NCES to collect information concerning financial aid allocated to students enrolled in U.S. postsecondary institutions. NPSAS was first administered in the fall of the 1986–1987 academic year. NCES conducted subsequent cycles of NPSAS for the 1989–1990, 1992–1993, and 1995–1996 school years. The 1989–1990 cycle contained enhancements to the methodology used in the 1987 cycle. Estimates from the 1996 NPSAS sample are generally comparable to those from the 1993 and 1990 samples but not to those from the 1987 sample.

The 1995–1996 survey gathered information from about 60,000 undergraduate and graduate students selected from registrar lists of enrollees at about 800 postsecondary institutions. The sample included students who did and did not receive financial aid, as well as students' parents. Student information, such as field of study, educational level, and attendance status (part-time or full-time), was obtained from registrar records. Types and amounts of financial aid and family financial characteristics were abstracted from school

financial aid records. Parents of students were also sampled to compile data concerning family composition and parental financial characteristics. Biennial follow-up data collections are expected.

Primary NSF Sources

The following NSF sources were used for data tables in this publication. Published data tables from these surveys may be accessed on the NSF Web page *(http://www.nsf.gov/sbe/srs)*. In addition, researchers may access the data directly through the SESTAT or WebCASPAR database systems on the Web.

Survey of Earned Doctorates

The Survey of Earned Doctorates (SED) has been conducted annually since 1957. Until 1996, it was conducted under contract with the National Research Council of the National Academy of Sciences, for the National Science Foundation, the U.S. Department of Education, the National Endowment for the Humanities, the National Institutes of Health, and the U.S. Department of Agriculture. This is a census survey of all recipients of research doctoral degrees such as PhD or D.Sc.; it excludes the recipients of first-professional degrees such as J.D. or M.D. Therefore, SED data are restricted to research doctorates.

Data for the SED are collected directly from individual doctorate recipients contacted through graduate deans at all U.S. universities. The recipients are asked to provide information on the field and specialty of their degree, as well as their personal educational history, selected demographic data, and information on their postgraduate work and study plans. Approximately 95 percent of the annual cohort of doctorate recipients respond to the questionnaire, which is distributed through the cooperation of the graduate deans at institutions awarding doctorates.

Partial data from public sources, such as field of study, are added to the file for nonrespondents. No imputations are made, however, for nonresponse for data not available elsewhere, such as race/ethnicity information. The data for a given year include all doctorates awarded in the 12-month period ending on June 30 of that year.

Survey of Graduate Students and Postdoctorates in Science and Engineering

The data collected in the fall 1995 Survey of Graduate Students and Postdoctorates in Science and Engineering (GSS) represent national estimates of graduate enrollment and postdoctoral employment at the beginning of academic year 1995–1996 in all academic institutions in the United States that offer doctorate or master's degree programs in any science or engineering field. Included are data for all branch campuses, affiliated research centers, and separately organized components, such as medical or dental schools, schools of nursing, public health. The survey universe consisted of 722 reporting units at 602 graduate institutions. Data are collected at the academic department level.

Available information includes full-time graduate students by source and mechanism of support, including data on women and first-year students enrolled full time; part-time graduate students by sex; and citizenship and racial/ethnic background of all graduate students. In addition, detailed data on postdoctorates are available by source of support, sex, and citizenship, including separate data on those holding first-professional doctorates in the health fields; summary information on other doctorate nonfaculty research personnel is also included.

The National Science Foundation has collected data on graduate science and engineering enrollment and postdoctoral appointees since 1966. From fall 1966 through fall 1971, data from a limited number of doctorate-granting institutions were collected through the NSF Graduate Traineeship Program, which requested data only on those science and engineering fields supported by NSF. Beginning with the fall 1972 survey, this data- collection effort was assigned to the Universities and Nonprofit Institutions Studies Group of SRS. It was gradually expanded during the period 1972–1975 to include additional science and engineering fields as well as all institutions known to have programs leading to the master's or doctorate degree. Because of this expansion, data for 1974 and earlier years are not strictly comparable with 1975 and later data.

NSF's SESTAT Data System

In the 1990s, NSF redesigned its data system about scientists and engineers. Termed SESTAT, the new data system integrates data from three NSF surveys (the Survey of Doctorate Recipients, the National Survey of College Graduates, and the National Survey of Recent College Graduates). The integration of the SESTAT surveys requires complementary sample populations and reference periods, matching survey questions and procedures, as well as weighting adjustments for any overlapping populations.

The surveys provide data on educational background, occupation, employment, and demographic characteristics. These surveys are of individuals and have a combined sample size of about 105,000, covering a population of about 12 million scientists and engineers. SESTAT defines scientists and engineers as those who either received a college degree (bachelor's level or higher) in a science or engineering field or

who work as a scientist or engineer. Each of the three surveys that make up the SESTAT data system collects new data every 2 years. The data reported in this publication were collected in 1995.

SESTAT has as its target population residents of the United States with a baccalaureate degree or higher who, as of the study's reference period, were noninstitutionalized, age 75 or less, and either trained as or working as a scientist or engineer (S&E). A baccalaureate-or-higher degree is a bachelor's, master's, doctorate, or professional degree. To meet the S&E requirement, the U.S. resident had to (1) have at least one baccalaureate-or-higher degree in an S&E field or (2) have a baccalaureate-or-higher degree in a non-S&E field and work in an S&E occupation as of the reference week. For the 1995 SESTAT, the reference period was the week of April 15, 1995.

Some elements of SESTAT's desired target population were not included within the target populations of any of the three SESTAT component surveys. Bachelor's- and master's-level S&E-trained personnel missing from the survey frames are predominately

- residents whose S&E bachelor's and/or master's degrees were received prior to April 1990 or from a foreign institution, who resided outside the United States on April 1, 1990, but not as U.S. armed forces stationed abroad;
- residents with no baccalaureate or higher degree in any field as of April 1, 1990, who were awarded an S&E degree after June 1994 by a U.S. institution or after April 1990, by a foreign institution.

Doctorate level S&E-trained personnel missing from the survey frames are predominately

- residents with S&E doctorates received after June 1994 or from a foreign institution, with no baccalaureate-or-higher degree in any field as of April 1, 1990, and no bachelor's or master's S&E degree received from a U.S. institution between April 1, 1990, and June 1994;
- residents with S&E doctorates received after June 1994 or from a foreign institution but with no bachelor's or master's S&E degree received from a U.S. institution between April 1, 1990, and June 1994, who resided outside the United States on April 1, 1990, but not as U.S. armed forces stationed abroad.

SESTAT classifies the following broad occupation categories as S&E occupations: computer and mathematical scientists, life and related scientists, physical and related scientists, social and related scientists, and engineers. Postsecondary teachers are included within each of these groups. The following are considered non-S&E occupations: top and midlevel managers; teachers, except S&E postsecondary teachers; technologists, including computer programmers; people in health and related occupations, social services and related occupations, sales and marketing occupations, and other non-S&E occupations (for example, artists, broadcasters, editors, entertainers, public relations specialists, writers, clerical and administrative support personnel, farmers, foresters, fishermen, lawyers, judges, librarians, archivists, curators, actuaries, food service, historians (except science and technology), construction trades people, mechanics and repairers, and those involved in precision/production occupations, operators (for example, machine set-up, machine operators and tenders, fabricators, assemblers) and related occupations, transportation/material moving occupations and protective and other service occupations.)

APPENDIX B

STATISTICAL TABLES

TABLES

Chapter 1

Chapter 2

Chapter 3

Chapter 4

Chapter 5

Appendix table 1-1. Resident population of the United States, by race/ethnicity and sex: July 1995

Page 1 of 1

Race/ethnicity and sex	Number (in thousands)	Percent
All races/ethnicities	262,890	100.0
Men	128,569	48.9
Women	134,321	51.1
White, non-Hispanic	193,281	73.5
Men	94,410	35.9
Women	98,871	37.6
Asian	8,836	3.4
Men	4,279	1.6
Women	4,557	1.7
Black, non-Hispanic	31,565	12.0
Men	14,932	5.7
Women	16,634	6.3
Hispanic	27,277	10.4
Men	13,998	5.3
Women	13,278	5.1
American Indian	1,931	0.7
Men	950	0.4
Women	981	0.4

NOTE: Because of rounding, details may not add to totals.

SOURCE: U.S. Bureau of the Census, PPL-57. *United States Population Estimates, by Age, Sex, Race, and Hispanic Origin, 1990 to 1996.*

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 1-2. Civilian labor force age 20 and older, by race, sex, and Hispanic origin: 1995

Race/ethnicity and sex	Number (in thousands)	Percent
All races	124,539	100.0
Men	67,324	54.1
Women	57,215	45.9
White	105,405	84.6
Men	57,719	46.3
Women	47,686	38.3
Black	13,905	11.2
Men	6,730	5.4
Women	7,175	5.8
Hispanic	11,418	9.2
Men	6,898	5.5
Women	4,520	3.6

NOTES: Details will not add to totals because data for "other races" group are not presented and Hispanics include both white and black population groups.

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 1-3. Number and percent of persons of all ages, by sex and disability status: 1994

Page 1 of 1

Race/ethnicity and sex	Number (in thousands)	Percent
All persons	261,749	100.0
Men	127,908	48.9
Women	133,840	51.1
With any disability	53,907	20.6
Men	25,335	9.7
Women	28,572	10.9
With a severe disability	25,969	9.9
Men	10,635	4.1
Women	15,334	5.9
With no disability	207,842	79.4
Men	102,574	39.2
Women	105,268	40.2

NOTE: Because of rounding, details may not add to totals.

SOURCE: U.S. Department of Commerce, Bureau of the Census, 1994-1995 data from the Survey of Income and Program Participation.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 1-4. Number and percent of employed persons of all ages, by sex and disability status: 1994

Page 1 of 1

Race/ethnicity and sex	Number (in thousands)	Percent
All persons	125,591	100.0
Men	67,937	54.1
Women	57,654	45.9
With any disability	17,507	13.9
Men	9,530	7.6
Women	7,977	6.4
With a severe disability	4,243	3.4
Men	2,004	1.6
Women	2,238	1.8
With no disability	108,084	86.1
Men	58,407	46.5
Women	49,677	39.6

NOTE: Because of rounding, details may not add up to totals.

SOURCE: U.S. Department of Commerce, Bureau of the Census, 1994-1995 data from the Survey of Income and Program Participation.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 1-5. Employed scientists and engineers, by sex, race/ethnicity, and disability status: 1995

Page 1 of 1

Sex, race/ethnicity and disability status	Number	Percent
All persons	3,185,600	100.0
Women	713,500	22.4
Men	2,472,100	77.6
White	2,673,600	83.9
Asian	304,600	9.6
Black	107,500	3.4
Hispanic	90,100	2.8
American Indian	8,000	0.3
With no disability	3,031,200	95.2
Women	682,200	21.4
Men	2,349,000	73.7
White	2,541,800	79.8
Asian	291,600	9.2
Black	103,600	3.3
Hispanic	85,200	2.7
American Indian	7,300	0.2
With a disability	154,400	4.9
Women	31,300	1.0
Men	123,100	3.9
White	131,900	4.1
Asian	13,000	0.4
Black	3,900	0.1
Hispanic	4,900	0.2
American Indian	700	0.0

NOTES: Because of rounding, details may not add to totals.
SOURCE: National Science Foundation/SRS 1995 SESTAT Integrated Data Files.

Appendix table 2-1. Percentage of public and private school students who were minority: 1987-1988, 1990-1991, and 1993-1994

Page 1 of 1

Year	Total	Public	Private
All minorities			
1987-1988	28.0	29.3	18.9
1990-1991	30.4	31.4	21.7
1993-1994	31.5	32.7	22.1
Asian			
1987-1988	2.6	2.5	3.2
1990-1991	3.0	2.9	4.1
1993-1994	3.4	3.4	4.1
Black, non-Hispanic			
1987-1988	15.3	16.3	8.1
1990-1991	15.3	16.1	8.3
1993-1994	15.5	16.3	9.3
Hispanic			
1987-1988	9.1	9.4	7.1
1990-1991	10.8	11.1	8.6
1993-1994	11.5	11.9	8.0

SOURCE: Henke, Robin R., Susan B. Choy, and Sonya Geis.1996. U.S. Department of Education/NCES. Schools and Staffing Survey: 1987-1988, 1990-1991, and 1993-1994 (School questionnaire).

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 2-2. Percentage of teachers who were minority, by sector: 1987-1988, 1990-1991, and 1993-1994

Page 1 of 1

Year	Total	Public	Private
1987-1988	11.9	12.5	6.9
1990-1991	12.8	13.5	7.8
1993-1994	12.8	13.5	8.1

SOURCE: Henke, Robin R., Susan B. Choy, and Sonya Geis. 1996. U.S. Department of Education/NCES. Schools and Staffing Survey: 1987-1988, 1990-1991, and 1993-1994 (Teacher questionnaire).

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 2-3. Students age 6-21 with disabilities receiving special education services, by educational environment: 1988-1994 school years

[Percent distribution]

Page 1 of 1

Year	Regular class	Resource room	Separate class	Public separate facility	Private separate facility	Public residential facility	Private residential facility	Homebound/ hospital
1987-1988	29.1	40.0	24.7	3.5	1.4	0.5	0.3	0.7
1988-1989	30.6	38.8	24.2	3.2	1.3	0.6	0.3	0.8
1989-1990	31.7	37.5	24.8	3.2	1.3	0.6	0.3	0.6
1990-1991	33.1	36.3	25.0	2.9	1.3	0.6	0.3	0.5
1991-1992	34.9	36.3	23.5	2.5	1.4	0.6	0.3	0.5
1992-1993	39.8	31.7	23.4	2.4	1.2	0.6	0.2	0.5
1993-1994	43.4	29.4	22.7	2.2	1.0	0.5	0.3	0.6

SOURCES: U.S. Department of Education, Office of Special Education and Rehabilitative Services, *Eighteenth Annual Report to Congress on the Implementation of the Individuals with Disabilities Education Act, 1996* and *Digest of Education Statistics,* 1989 to 1995.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 2-4. Students age 6-21 with disabilities receiving special education services, by type of disability and educational environment: 1993-1994 school year

[Percent distribution]

Page 1 of 1

Disability	Regular class	Resource room	Separate class	Separate school	Residential facility	Homebound/ hospital
All disabilities	43.4	29.5	22.7	3.1	0.7	0.6
Specific learning disabilities	39.3	41.0	18.8	0.6	0.1	0.1
Speech or language impairments	87.5	7.6	4.5	0.3	0.0	0.1
Mental retardation	8.6	26.1	57.0	7.0	0.7	0.5
Serious emotional disturbance	20.5	25.8	35.3	13.4	3.2	1.8
Multiple disabilities	9.1	19.8	44.1	21.8	3.2	2.0
Hearing impairments	30.6	20.0	30.6	7.0	11.6	0.2
Orthopedic impairments	37.4	20.7	33.3	5.3	0.5	2.9
Other health impairments	40.0	27.0	21.3	1.8	0.4	9.4
Visual impairments	45.2	21.3	18.3	4.1	10.6	0.5
Autism	9.6	8.1	54.5	23.4	3.9	0.5
Deaf-blindness	7.7	8.0	34.6	24.3	23.2	2.2
Traumatic brain injury	22.3	23.5	30.2	18.3	2.6	3.0

SOURCE: U.S. Department of Education, Office of Special Education and Rehabilitative Services. 1996. *Eighteenth Annual Report to Congress on the Implementation of the Individuals with Disabilities Education Act.*

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 2-5. Percentage of high school graduates taking selected mathematics and science courses in high school, by sex: 1982, 1987, 1990, and 1994

Page 1 of 1

Mathematics and science courses (credits)	1982 [1]			1987 [1]			1990 [1]			1994		
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
Mathematics [2]												
Any mathematics (1.00)	98.5	98.8	98.3	98.9	98.7	99.1	99.6	99.5	99.6	99.6	99.5	99.6
Algebra I (1.00)	53.9	52.2	55.4	64.0	62.3	65.7	64.2	61.7	66.5	66.4	64.7	68.1
Geometry (1.00)	45.5	45.0	45.9	59.7	58.8	60.4	63.4	62.4	64.4	70.4	68.3	72.4
Algebra II (0.50)	32.2	32.4	32.0	48.6	47.3	48.9	51.7	50.0	53.3	58.6	55.4	61.6
Trigonometry (0.50)	12.1	13.2	11.1	18.6	19.5	17.6	18.2	18.1	18.2	17.2	16.6	17.8
Analysis/precalculus (0.50)	5.9	6.2	5.6	12.6	13.5	11.6	13.4	14.0	12.8	17.3	16.3	18.2
Statistics/probability (0.50)	1.0	1.1	0.9	1.3	1.1	1.2	1.0	1.2	0.8	2.0	2.0	2.1
Calculus (1.00)	4.6	5.1	4.1	6.0	7.4	4.6	6.5	7.5	5.6	9.2	9.4	9.1
AP calculus (1.00)	1.5	1.6	1.4	3.2	3.8	2.7	4.1	5.0	3.4	7.0	7.2	6.8
Science												
Any science (1.00)	96.6	96.4	96.7	98.7	98.4	99.0	99.4	99.1	99.6	99.5	99.3	99.8
Biology (1.00)	76.4	74.2	78.4	87.8	86.3	89.4	91.3	90.0	92.5	93.5	92.3	94.7
AP/honors biology (1.00)	6.6	6.1	7.1	2.7	2.8	2.6	4.9	4.4	5.4	4.6	4.0	5.1
Chemistry (1.00)	30.9	31.9	30.0	43.7	44.3	43.2	49.0	47.9	50.0	56.0	53.2	58.7
AP/honors chemistry (1.00)	2.9	3.5	2.3	3.3	3.9	2.7	3.5	4.1	2.9	3.9	4.1	3.7
Physics (1.00)	14.2	18.8	10.0	19.2	24.0	14.6	21.5	25.4	18.0	24.4	26.9	22.0
AP/honors physics (1.00)	1.0	1.4	0.7	1.6	2.4	0.9	2.0	2.5	1.6	2.4	3.0	1.8
Engineering (1.00)	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	[3] 0.0	0.3	0.4	0.2
Astronomy (0.50)	1.1	1.3	0.9	1.0	1.1	0.8	1.2	1.4	1.1	1.7	2.0	1.5
Geology/earth science (0.50)	13.2	14.2	12.3	14.5	15.0	13.8	24.8	25.7	24.1	23.0	22.8	23.2
Biology and chemistry (2.00)	28.1	28.2	28.0	42.1	42.2	42.0	47.6	46.4	48.8	53.8	50.9	56.6
Biology, chemistry, physics (3.00)	10.6	13.4	7.9	16.4	20.2	12.8	18.8	21.8	16.1	21.3	23.1	19.6

[1] Numbers were revised from previously published figures.

[2] These data report only the percentage of students who earned credit in each mathematics course while in high school and do not count those students who took these courses prior to entering high school. In 1992, for example, approximately 93 percent of students had taken algebra I at some point before graduating high school, either before or during high school, and about 70 percent had taken geometry.

[3] Percent is less than 0.05 and is rounded to 0.

SOURCE: Smith, Thomas D., Charlene M. Hoffman, and Claire M. Geddes. 1997. U.S. Department of Education, National Center for Education Statistics, *The Condition of Education, 1996* (NCES 96-304), supplemental table 29-1.

166

167

Appendix table 2-6. Average NAEP scale scores in science and mathematics in grades 4, 8, and 12, by sex and race/ethnicity: 1996

Page 1 of 1

	Mathematics			Science [1]		
	Grade 4	Grade 8	Grade 12	Grade 4	Grade 8	Grade 12
All students	224	272	304	150	150	150
Male	226	272	305	151	151	152
Female	222	272	303	149	149	148
White	232	282	311	160	159	159
Asian	232	*	319	151	152	149
Black	200	243	280	124	121	124
Hispanic	206	251	287	128	129	130
American Indian	216	264	279	144	148	145

[1] NAEP science scales were developed independently for each grade assessed; therefore, results are not comparable across grades. Science scale scores for all grades range from 0 to 300.

*Quality-control activities and special analyses involving state assessment data raised concerns about the accuracy and precision of national grade 8 Asian results. Therefore, they are omitted from this table.

NOTES: Standard errors are included in source publication. Mathematics scale scores range from 0 to 500 across all three grades.

SOURCES: Reese et al. 1997. *NAEP 1996 Mathematics Report Card for the Nation and the States* and O'Sullivan et al. 1997. *NAEP 1996 Science Report Card for the Nation and the States*, Washington, DC: U.S. Department of Education.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 2-7. Average mathematics scale scores, by sex and race/ethnicity: 1990, 1992, and 1996

Page 1 of 1

	1990	1992	1996
Grade 4			
All students	213	220	224
Male	214	221	226
Female	213	219	222
White	220	228	232
Asian	228	232	232
Black	189	193	200
Hispanic	198	202	206
American Indian	208	211	216
Grade 8			
All students	263	268	272
Male	263	268	272
Female	262	269	272
White	270	278	282
Asian	279	288	**
Black	238	238	243
Hispanic	244	247	251
American Indian	246	255	264
Grade 12			
All students	294	299	304
Male	297	301	305
Female	291	298	303
White	301	306	311
Asian	311	316	319
Black	268	276	280
Hispanic	276	284	287
American Indian	*	*	279

* Sample size insufficient to permit a reliable estimate.
**Quality-control activities and special analyses involving state assessment data raised concerns about the accuracy and precision of national grade 8 Asian results. Therefore, they are omitted from this table.

NOTE: Mathematics scale scores range from 0 to 500 across all three grades.

SOURCE: Reese et al. 1997. *NAEP 1996 Mathematics Report Card for the Nation and the States*. Washington, DC: U.S. Department of Education.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 2-8. Percentage attaining mathematics proficiency levels on the National Assessment of Educational Progress for grades 4, 8, and 12, by sex and race/ethnicity: 1990-1996, selected years

Page 1 of 1

	1990				1992				1996			
	Advanced	At or above proficient	At or above basic	Below basic	Advanced	At or above proficient	At or above basic	Below basic	Advanced	At or above proficient	At or above basic	Below basic
Grade 4												
All students	1	13	50	50	2	18	59	41	2	21	64	36
Male	2	13	51	49	2	19	60	40	3	24	65	35
Female	1	12	49	51	1	16	57	43	1	19	63	37
White	2	16	59	41	2	23	70	30	3	28	76	24
Asian	3	23	65	35	4	30	75	25	5	26	73	27
Black	0	1	19	81	0	3	23	77	0	5	32	68
Hispanic	0	5	31	69	0	5	35	65	0	8	41	59
American Indian	0	5	44	56	2	10	43	57	1	8	52	48
Grade 8												
All students	2	15	52	48	3	21	58	42	4	24	62	38
Male	2	17	52	48	3	21	57	43	4	25	62	38
Female	2	14	52	48	3	21	58	42	3	23	63	37
White	3	19	61	39	4	27	69	31	5	31	74	26
Asian	5	32	71	29	13	40	76	24	**	**	**	**
Black	0	5	22	78	0	2	21	79	0	4	28	72
Hispanic	0	5	32	68	1	6	34	66	1	9	39	61
American Indian	0	6	33	67	0	7	39	61	2	13	51	49
Grade 12												
All students	1	12	58	42	2	15	64	36	2	16	69	31
Male	2	15	60	40	2	17	65	35	3	18	70	30
Female	1	9	56	44	1	13	63	37	1	14	69	31
White	2	14	66	34	2	18	72	28	2	20	79	21
Asian	5	23	75	25	4	30	81	19	7	33	81	19
Black	0	2	27	73	0	2	34	66	0	4	38	62
Hispanic	0	4	36	64	0	6	45	55	0	6	50	50
American Indian	*	*	*	*	*	*	*	*	0	3	34	66

* Sample size insufficient to permit a reliable estimate.

**Quality-control activities and special analyses involving assessment data raised concerns about the accuracy and precision of national grade 8 Asian results. Therefore, they are omitted from the table.

NOTE: Standard errors are included in source publication.

SOURCE: Reese et al. 1997. *NAEP 1996 Mathematics Report Card for the Nation and the States.* Washington, DC: U.S. Department of Education.

Appendix table 2-9. Percentage of high school graduates taking selected science and mathematics courses in high school, by race/ethnicity: 1982, 1987, 1990, and 1994

Page 1 of 1

Courses (credits)	1982[1]					1987[1]					1990					1994				
	White	Black	Hispanic	Asian	American Indian	White	Black	Hispanic	Asian	American Indian	White	Black	Hispanic	Asian	American Indian	White	Black	Hispanic	Asian	American Indian
Mathematics[2]																				
Any mathematics (1.00)	98.7	99.2	97.2	100.0	99.6	98.9	98.2	99.1	99.8	98.7	99.5	99.5	99.9	99.9	100.0	99.6	99.3	99.2	100.0	98.9
Algebra I (1.00)	57.8	42.4	42.4	55.5	33.2	66.1	54.6	53.6	63.6	60.9	64.2	65.1	64.8	63.2	61.7	67.5	65.0	70.7	61.7	58.7
Geometry (1.00)	51.0	28.8	25.6	64.9	33.2	63.0	42.2	39.6	81.1	43.2	65.6	56.2	53.6	70.6	55.7	72.7	58.1	69.4	75.8	60.0
Algebra II (0.50)	36.0	22.0	18.0	45.6	10.8	51.6	30.8	29.2	66.4	27.6	55.0	41.4	35.7	59.9	47.1	61.6	43.7	51.0	66.6	39.2
Trigonometry (0.50)	13.7	6.0	6.4	26.8	3.0	20.4	10.6	9.8	41.3	4.2	19.3	14.0	10.8	35.1	14.7	18.6	13.6	9.8	25.3	6.7
Analysis/precalculus (0.50)	6.8	2.2	2.8	14.5	1.8	13.2	5.1	7.3	39.4	5.4	14.8	6.2	7.2	25.3	7.6	18.2	9.8	13.9	33.9	8.7
Statistics/probability (0.50)	1.2	0.5	0.1	1.7	[3] 0.0	1.4	0.3	0.2	1.5	0.0	1.0	1.1	0.9	1.5	0.3	2.3	1.7	1.0	1.1	1.2
Calculus (1.00)	5.4	1.3	1.7	12.8	4.0	5.6	2.2	3.6	29.4	0.4	6.9	2.8	3.8	18.5	4.2	9.6	3.8	6.0	23.4	3.8
AP calculus (1.00)	1.8	0.3	0.4	5.5	0.1	2.7	1.4	2.6	23.5	0.4	4.2	1.2	3.0	15.6	3.0	7.3	2.0	4.6	21.0	2.2
Science																				
Any science (1.00)	96.9	97.4	93.8	96.2	92.1	98.8	98.1	98.6	99.3	99.8	99.3	99.6	99.3	99.8	100.0	99.7	99.5	99.3	99.3	99.7
Biology (1.00)	78.3	73.0	68.2	83.7	66.7	88.7	84.7	85.4	91.5	90.2	91.5	91.3	90.3	90.4	90.5	94.4	91.3	94.0	90.9	91.2
AP/honors biology (1.00)	7.4	4.6	3.1	11.9	0.6	2.7	1.4	1.6	4.2	0.3	5.0	3.8	2.4	6.3	1.9	4.6	2.7	3.3	8.3	1.7
Chemistry (1.00)	34.1	21.9	15.5	52.8	25.9	46.6	28.4	29.1	69.8	26.4	51.5	40.3	38.4	63.6	35.5	58.5	43.8	46.5	69.3	41.3
AP/honors chemistry (1.00)	3.3	1.6	1.3	5.8	0.9	3.4	1.1	2.2	15.3	0.6	3.7	2.5	1.1	7.7	4.5	4.3	2.1	2.5	7.7	0.6
Physics (1.00)	16.3	7.3	5.7	34.8	8.1	20.6	9.7	9.9	46.5	8.3	23.1	14.6	13.3	38.4	14.7	26.1	14.7	16.0	42.3	10.3
AP/honors physics (1.00)	1.2	0.9	0.4	3.4	[3] 0.0	1.6	0.4	0.8	5.6	1.4	2.1	0.7	1.0	5.9	0.5	2.5	1.4	1.8	6.0	0.3
Engineering (1.00)	0.2	0.1	0.1	[3] 0.0	[3] 0.0	0.1	0.4	0.1	0.4	[3] 0.0	0.1	0.1	[3] 0.0	[3] 0.0	[3] 0.0	0.2	0.4	0.1	1.0	[3] 0.0
Astronomy (0.50)	1.3	0.4	0.7	[3] 0.0	[3] 0.0	0.9	0.3	0.7	0.7	0.5	1.4	0.4	1.1	0.7	1.7	2.0	0.6	0.4	0.8	2.2
Geology/earth science (0.50)	14.0	10.0	11.2	9.6	18.8	14.0	18.1	11.6	12.4	12.3	27.6	15.9	14.0	15.7	31.0	23.8	23.3	15.3	16.7	23.2
Biology and chemistry (2.00)	31.3	19.7	14.2	48.5	21.9	45.1	27.2	27.9	66.3	24.8	50.2	39.5	36.5	60.1	34.2	56.4	42.2	45.1	64.8	39.6
Biology, chemistry, and physics (3.00)	12.2	4.8	3.9	28.4	7.8	17.6	8.3	8.2	41.8	6.2	20.6	12.0	10.2	33.7	10.8	22.7	13.0	13.4	37.2	8.0

[1] Numbers were revised from previously published figures.
[2] These data report only the percentage of students who earned credit in each mathematics course while in high school and do not count those students who took these courses prior to entering high school. In 1992, for example, approximately 93 percent of students had taken algebra I at some point before graduating high school, either before or during high school, and about 70 percent had taken geometry.
[3] Percent is less than 0.05 and is rounded to 0.

SOURCE: Smith et al. 1996. U.S. Department of Education, National Center for Education Statistics, The 1994 High School Transcript Study Tabulations: Comparative Data on Credits Earned and Demographics for 1994, 1990, 1987, and 1982 High School Graduates, 1996, in *The Condition of Education: 1996, p. 255.*

Appendix table 2-10. Students age 6–21 in federally supported programs for students with disabilities, by type of disability: 1994–1995 school year

Page 1 of 1

Disability	Number	Percent
All disabilities	4,915,168	100.0
Specific learning disabilities	2,513,977	51.1
Speech or language impairments	1,023,665	20.8
Mental retardation	570,855	11.6
Serious emotional disturbance	428,168	8.7
Multiple disabilities	89,646	1.8
Hearing impairments	65,568	1.3
Orthopedic impairments	60,604	1.2
Other health impairments	106,509	2.2
Visual impairments	24,877	0.5
Autism	22,780	0.5
Deaf-blindness	1,331	0.0
Traumatic brain injury	7,188	0.1

NOTES: Because of rounding, percentages may not add to 100. Includes students served under IDEA, Part B.

SOURCE: U.S. Department of Education, Office of Special Education and Rehabilitative Services. 1996. *Eighteenth Annual Report to Congress on the Implementation of the Individuals with Disabilities Education Act.*

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 2-11. Total units in mathematics and science completed by students in the 12th grade in 1992 and average high school grade, by disability status and type of disability: 1992

Page 1 of 1

	Average mathematics units	Average science units	Average high school grade in mathematics	Average high school grade in science
Students without disabilities	2.9	2.7	7.63	7.43
Students with disabilities	2.4	2.2	8.37	8.32
Multiple disabilities	2.5	1.9	8.27	8.70
Learning disability	2.3	2.1	8.51	8.60
Health problems	2.4	2.1	8.07	8.06
Physical or emotional problems	2.6	2.1	8.26	8.25
Physical	2.6	2.3	7.98	7.89
Emotional	2.5	1.8	8.67	8.92
Sensory	2.4	2.2	8.12	8.08

NOTES: Students were identified as disabled by parents. High school credit units in mathematics and science are as reported on their high school transcripts. Data represent the eighth-grade panel population Grade is based on a 1-13 scale, where 1.0 = A+ and 13 = F.

SOURCE: Rossi, Robert, Jerald Herting, and Jean Wolman. 1997. U.S. Department of Education/NCES, *Profiles of Students with Disabilities as Identified in NELS:88* (NCES 97-254)

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 2-12. Proficiency in mathematics and science of students in the 12th grade, by disability status and type of disability: 1992

[In percentages]

	Below level 1	Level 1	Level 2	Level 3	Level 4	Level 5	Percent change in number right in mathematics, from 1988 to 1992
Students without disabilities	6.5	20.8	14.4	24.2	30.0	4.1	11.8
Students with disabilities	14.9	33.3	17.9	17.2	13.4	3.3	10.0
Multiple disabilities	19.9	38.1	15.7	15.9	9.9	0.5	8.9
Learning disability	22.9	38.2	17.6	15.1	5.7	0.4	8.7
Health problems	7.2	27.1	16.2	20.0	20.7	8.7	11.9
Physical or emotional problems	12.1	32.0	16.3	18.8	17.0	3.8	10.6
Physical	16.2	29.1	12.9	18.2	15.1	8.6	12.2
Emotional	11.7	41.6	9.9	26.4	8.6	1.8	10.6
Sensory	11.9	32.2	19.6	13.0	20.8	2.5	9.7

NOTES: Students were identified as disabled by parents. Data represent the eighth-grade panel population. Percentage represents the distribution within each disability status. Proficiency measures are based on standardized cognitive tests administered to all NELS:88 student participants in 1988, 1990, and 1992. Students achieved a specific proficiency level if they correctly answered at least three of the four questions within a proficiency level. Students at particular skill levels were assumed to have mastered the lower skill levels; likewise, students were assumed not to have mastered higher level skills. Only students with complete and consistent response patterns were assigned proficiency levels.

SOURCE: Rossi, Robert, Jerald Herting, and Jean Wolman. 1997. U.S. Department of Education/NCES, *Profiles of Students with Disabilities as Identified in NELS:88* (NCES 97-254).

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 2-13. Percentage of persons who have completed high school, by race/ethnicity and sex: 1975, 1985, and 1995

Page 1 of 1

	25 years old and over			25 to 29 years old		
	1975	1985	1995	1975	1985	1995
Total	62.5	73.9	81.7	83.1	86.1	86.9
Men	63.1	74.4	81.7	84.5	85.9	86.3
Women	62.1	73.5	81.6	81.8	86.4	87.4
White, non-Hispanic	65.8	77.5	85.9	86.6	89.5	92.5
Black, non-Hispanic	42.6	59.9	73.8	71.1	80.5	86.7
Hispanic	38.5	47.9	53.4	53.1	60.9	57.2

SOURCES: Day, Jennifer, and Curry, Andrea. 1996. *Educational Attainment in the United States: March 1995.* Current Population Reports P20-489. Washington, DC.: U.S. Department of Commerce.

Snyder, Thomas D., Charlene M. Hoffman, and Claire M. Geddes. 1998. *Digest of Education Statistics 1997* (NCES 98-015). Washington, DC: U.S. Government Printing Office.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 2-14. Percentage of students with disabilities age 14 and older exiting special education, by type of disability and basis of exit: 1993-1994

Type of disability	Total	Graduated with diploma	Graduated with certificate	Reached maximum age	Returned to regular education	Moved, known to be continuing	Moved, not known to be continuing	Died	Dropped out
All disabilities	26.8	7.5	1.6	0.3	4.0	5.5	2.8	0.1	5.1
Specific learning disabilities	25.9	8.4	1.2	0.1	3.8	5.0	2.5	0.1	4.9
Speech or language impairments	38.2	7.0	1.0	0.2	17.0	4.9	4.2	0.1	3.8
Mental retardation	21.9	5.8	3.8	1.0	0.9	4.1	2.0	0.2	4.2
Serious emotional disturbance	37.0	6.0	0.9	0.2	4.3	10.7	5.8	0.1	9.2
Multiple disabilities	12.8	3.2	1.7	1.4	0.8	3.1	0.8	0.3	1.4
Hearing impairments	22.0	9.7	1.7	0.2	2.3	3.9	1.6	0.1	2.5
Mobility impairments	26.9	9.0	1.7	0.8	7.3	3.7	1.6	0.5	2.4
Other health impairments	39.8	8.5	0.7	0.2	17.9	5.8	2.0	0.4	3.8
Visual impairments	22.2	10.3	1.2	0.6	2.4	3.6	1.8	0.2	2.2
Autism	12.1	2.9	2.1	1.4	0.9	2.6	1.3	0.1	1.0
Deaf-blindness	24.9	6.0	4.6	1.4	1.9	5.6	3.0	1.1	1.4
Traumatic brain injury	26.7	9.5	1.8	1.0	3.0	6.4	1.9	0.1	3.0

NOTE: Because of rounding, details may not add to totals.

SOURCE: U.S. Department of Education, Office of Special Education Programs. 1996. *Eighteenth Annual Report to Congress on the Implementation of The Individuals with Disabilities Education Act.*

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 2-15. SAT average scores, by family income: 1996

Page 1 of 1

Family income	SAT I test takers	Percent		SAT I verbal	SAT I mathematics
	Number	Male	Female	Mean scores	Mean scores
Less than $10,000	45,841	37	63	429	444
$10,000-$20,000	86,005	41	59	456	464
$20,000-$30,000	108,048	43	57	482	482
$30,000-$40,000	130,075	45	55	497	495
$40,000-$50,000	108,641	47	53	509	507
$50,000-$60,000	102,562	48	52	517	517
$60,000-$70,000	78,463	48	52	524	525
$70,000-$80,000	63,841	49	51	531	533
$80,000-$100,000	74,691	49	51	541	544
More than $100,000	100,429	51	49	560	569
No response	186,129	-	-	-	-

NOTE: - = Not applicable.

SOURCE: College Board, 1996a. Profile of College-Bound Seniors National Report.

Appendix table 2-16. Course-taking patterns of college-bound seniors, by mathematics and science fields: 1996

Page 1 of 1

Mathematics	SAT I test takers		Percent		SAT I mean scores	
	Number	Percent	Male	Female	Verbal	Mathematics
Years of study						
4 or more years	671,345	68	46	54	522	530
3 years	279,791	28	44	56	477	465
2 years	29,238	3	45	55	448	428
1 year	1,724	-	50	50	417	418
One-half year or less	1,090	-	43	57	438	438
No response	101,537	-	-	-	-	-
Course Work						
Algebra	974,657	96	46	54	506	508
Geometry	951,031	94	46	54	511	514
Trignometry	536,834	53	47	53	534	547
Precalculus	389,321	38	47	53	555	576
Other mathematics courses	240,080	24	44	56	484	482
Calculus	231,410	23	50	50	579	612
Computer mathematics	91,003	9	56	44	519	538
Honors course taken	286,219	29	47	53	576	598

Natural sciences	SAT I test takers		Percent		SAT I mean scores	
	Number	Percent	Male	Female	Verbal	Mathematics
Years of study						
4 or more years	463,982	48	47	53	536	544
3 years	367,245	38	44	56	492	488
2 years	116,435	12	45	55	458	454
1 year	17,652	2	46	54	430	438
One-half year or less	7,452	1	41	59	413	426
No response	111,959	-	-	-	-	-
Course Work						
Biology	938,372	97	46	54	507	509
Chemistry	857,688	84	46	54	518	523
Physics	480,632	47	50	50	542	559
Geology, earth science, or space science	441,018	43	46	54	499	496
Other sciences	377,829	37	42	58	500	498
Honors course taken	281,448	29	45	55	577	587

NOTE: - = Not applicable.

SOURCE: College Board, 1996a. Profile of College-Bound Seniors National Report.

Appendix table 2-17. Advanced Placement (AP) candidates, by selected subjects and sex: 1996

AP exam subject	Total	Male	Female	Percent female
Biology	64,651	28,746	35,905	55
Chemistry	37,462	21,808	15,834	42
Physics B	18,644	12,195	6,449	35
Physics C, mechanics	11,072	8,158	2,914	26
Physics C, (electronics and magnetism)	5,662	4,392	1,270	22
Calculus AB	102,029	54,202	47,827	47
Calculus BC	20,823	13,006	7,817	38
Computer science A	6,488	5,217	1,271	20
Computer science AB	4,577	4,029	548	12
Psychology	14,308	4,986	9,322	65
Economics-micro	10,025	5,995	4,030	40
Economics-macro	13,252	7,691	5,561	42

NOTE: An AP exam candidate may have taken exams in more than one subject.

SOURCE: The College Board, 1996b. Advanced Placement Program National Summary Reports, pp. 3-5.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 2-18. Trends in average (mean) SAT mathematics and verbal scores, by race/ethnicity: 1991–1996

Race/ethnicity	1991	1992	1993	1994	1995	1996	1991 to 1996 change: Number	1991 to 1996 change: Percent
Total								
Number of students	1,032,685	1,034,131	1,044,465	1,050,386	1,067,993	1,084,725	52,040	5
SAT V - mean	499	500	500	499	504	505	6	-
SAT M - mean	500	501	503	504	506	508	8	-
White								
Number of students	687,231	680,806	670,965	662,107	674,343	681,053	(6,178)	-1
SAT V - mean	518	519	520	520	525	526	8	-
SAT M - mean	513	515	517	519	521	523	10	-
Asian American								
Number of students	76,703	78,387	78,693	81,097	81,514	84,319	7,616	10
SAT V - mean	485	487	489	489	492	496	11	-
SAT M - mean	548	551	553	553	555	558	10	-
Black								
Number of students	100,209	99,126	102,939	102,679	103,872	106,573	6,364	6
SAT V - mean	427	428	429	428	432	434	7	-
SAT M - mean	419	419	421	421	422	422	3	-
Mexican American								
Number of students	28,602	30,336	32,355	35,397	36,323	36,689	8,087	28
SAT V - mean	454	449	451	448	453	455	1	-
SAT M - mean	459	457	459	458	458	459	0	-
Puerto Rican[1]								
Number of students	12,065	12,091	12,645	13,036	13,056	13,103	1,038	9
SAT V - mean	436	442	443	444	448	452	16	-
SAT M - mean	439	438	440	442	444	445	6	-
Latin American								
Number of students	25,584	26,766	28,420	29,395	30,713	32,193	6,609	26
SAT V - mean	458	459	460	460	465	465	7	-
SAT M - mean	462	463	463	464	468	466	4	-
American Indian								
Number of students	7,843	7,412	7,488	8,150	8,936	8,737	894	11
SAT V - mean	470	472	477	473	480	483	13	-
SAT M - mean	468	471	476	470	476	477	9	-
Other								
Number of students	16,300	17,771	19,614	22,198	25,113	28,099	11,799	72
SAT V - mean	486	491	497	500	507	511	25	-
SAT M - mean	492	498	501	504	510	512	20	-

[1] Excludes students in Puerto Rico.

NOTES: - = not applicable. V = verbal, M = mathematics. Total includes persons of unknown race/ethnicity.

SOURCE: College Board, 1996 unpublished tabulations.

Appendix table 2-19. Trends in average ACT composite scores, by race/ethnicity: 1991-1996

Page 1 of 1

Race/ethnicity	Number	Mean ACT score
Total		
1991	796,983	20.6
1992	832,217	20.6
1993	875,603	20.7
1994	891,714	20.8
1995	945,369	20.8
1996	924,663	20.9
White		
1991	588,060	21.3
1992	604,469	21.3
1993	625,242	21.4
1994	623,366	21.4
1995	650,664	21.5
1996	654,377	21.6
Asian American/Pacific Islander		
1991	20,854	21.6
1992	22,771	21.6
1993	24,754	21.7
1994	26,168	21.7
1995	27,784	21.6
1996	27,847	21.6
African-American/Black		
1991	72,681	17.0
1992	75,356	17.0
1993	80,401	17.1
1994	81,806	17.0
1995	89,155	17.1
1996	87,630	17.0
Mexican American/Chicano		
1991	23,837	18.4
1992	26,163	18.4
1993	27,713	18.5
1994	29,558	18.4
1995	24,431	18.6
1996	21,345	18.7
Puerto Rican[1]/Cuban/Other Hispanic		
1991	11,135	19.3
1992	13,013	19.3
1993	13,894	19.3
1994	15,119	19.3
1995	24,054	18.7
1996	25,857	18.9
American Indian/Alaskan Native		
1991	9,358	18.2
1992	9,784	18.1
1993	10,384	18.4
1994	11,026	18.5
1995	11,361	18.6
1996	11,580	18.8

[1] Excludes students in Puerto Rico, because test is not given there.

SOURCE: American College Testing. 1996. Results, Summary Reports.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 2-20. Selected characteristics of persons who took the SAT: 1996

Page 1 of 1

Sex and race/ethnicity	Took SAT	Have a parent with college degree		Took PSAT	
	Number	Number	Percent	Number	Percent
Total	1,084,725	519,515	48	765,384	71
Women	580,127	267,776	46	429,309	74
Men	504,598	251,739	50	336,075	67
White	681,053	384,478	56	541,748	80
Women	366,985	198,079	54	300,520	82
Men	314,068	186,399	59	241,228	77
Asian and Pacific Islander	84,319	48,239	57	62,564	74
Women	42,956	23,879	56	33,046	77
Men	41,363	24,360	59	29,518	71
Black	106,573	36,185	34	69,734	65
Women	62,840	19,683	31	43,631	69
Men	43,733	16,502	38	26,103	60
Hispanic, total	81,985	26,597	32	54,359	66
Women	46,131	13,794	30	31,578	68
Men	35,854	12,803	36	22,781	64
Puerto Rican[1]	13,103	4,868	37	8,653	66
Women	7,478	2,531	34	5,044	67
Men	5,625	2,337	42	3,609	64
Mexican-American	36,689	8,941	24	23,928	65
Women	20,532	4,596	22	13,866	68
Men	16,157	4,345	27	10,062	62
Other Hispanic	32,193	12,788	40	21,778	68
Women	18,121	6,667	37	12,668	70
Men	14,072	6,121	43	9,110	65
American Indian/Alaskan Native	8,737	3,713	42	5,772	66
Women	4,673	1,878	40	3,241	69
Men	4,064	1,835	45	2,531	62
Other	28,099	15,364	55	19,862	71
Women	15,563	8,042	52	11,379	73
Men	12,536	7,322	58	8,483	68
No response	93,959	-	-	-	-
Women	40,979	-	-	-	-
Men	52,980	-	-	-	-

[1] Excludes students in Puerto Rico.

NOTE: - = Not applicable.

SOURCE: The College Board, 1996 unpublished tabulations.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 2-21. Average ACT composite scores, by type of high school program, race/ethnicity, and annual family income: 1996

Race/ethnicity and type of program[1]	Annual family income: Less than $18,000 Number	ACT score	$18,000-$35,999 Number	ACT score	$36,000 or more Number	ACT score
Total[2]						
Total[3]	104,195	18.5	229,613	20.1	475,456	21.9
Core	52,650	19.7	128,846	21.2	306,653	22.8
Less than core	50,010	17.4	98,734	18.6	165,497	20.1
White						
Total	50,187	20.1	157,413	20.9	393,479	22.1
Core	25,080	21.5	88,415	22.0	254,197	23.0
Less than core	24,727	18.8	68,054	19.4	137,138	20.4
Asian American/Pacific Islander						
Total	4,775	18.7	7,486	20.6	13,464	23.3
Core	3,041	19.5	5,186	21.4	10,033	23.8
Less than core	1,643	17.1	2,172	18.9	3,221	21.6
African-American/Black						
Total	26,687	16.2	30,271	16.9	23,034	18.2
Core	13,563	17.0	16,615	17.7	14,172	19.0
Less than core	12,888	15.4	13,389	15.8	8,707	16.9
American Indian/Alaskan Native						
Total	2,535	17.3	3,993	18.5	4,117	20.1
Core	1,033	18.8	1,938	19.6	2,279	21.2
Less fhan core	1,306	16.6	1,922	17.5	1,748	18.8
Mexican American/Pacific Islander						
Total	5,340	17.4	7,598	18.4	7,020	20.1
Core	2,739	18.4	4,060	19.4	4,253	21.1
Less than core	2,562	16.3	3,486	17.2	2,729	18.6
Puerto Rican[4]/Cuban/Other Hispanic						
Total	6,277	17.2	8,342	18.5	9,160	20.6
Core	3,149	18.3	4,681	19.4	5,916	21.4
Less than core	2,943	16.1	3,512	17.2	3,102	18.9

[1] Type of high school program is divided into *Core* and *Less than core* programs. Core programs are defined by ACT as 4 years of English and 3 years each of mathematics, natural sciences, and social sciences.

[2] Excludes persons not included in the racial/ethnic groups below.

[3] Excludes persons not classified by type of program.

[4] This does not include students in Puerto Rico, because test is not given there.

SOURCE: American College Testing. 1996. Results, Summary Reports.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 2-22. Advanced Placement (AP) candidates, by selected subjects and race/ethnicity: 1996

Selected science/mathematics AP subject	Total, all candidates	Underrepresented minorities						
		American Indian/Alaskan Native (2,491)	Black (22,373)	Hispanic: Mexican American (20,318)	Hispanic: Puerto Rican (13,527)	Hispanic: Other Hispanic (18,476)	Total under-represented minorities	Percentage under-represented minorities
Biology	64,651	281	2,619	1,066	361	1,414	5,741	9
Chemistry	37,642	151	1,286	633	132	634	2,836	8
Physics B	18,644	61	529	298	74	402	1,364	7
Physics C (mechanics)	11,072	34	236	161	39	220	690	6
Physics C (electronics and magnetism)	5,662	14	99	55	18	95	281	5
Calculus AB	102,029	360	3,689	2,310	400	1,985	8,744	9
Calculus BC	20,823	44	353	174	52	326	949	5
Computer science A	6,488	28	283	115	42	167	635	10
Computer science AB	4,577	22	80	50	18	75	245	5
Psychology	14,308	64	538	255	73	415	1,345	9
Economics-micro	10,025	40	241	256	42	204	783	8
Economics-macro	13,252	45	419	409	68	479	1,420	11

NOTE: Numbers in parentheses indicate the total persons in each group who took any AP test in 1996.

SOURCE: The College Board, 1996b. Advanced Placement Program National Summary Reports, p. 3.

Appendix table 3-1. Number of earned bachelor's degrees, by field and by race/ethnicity of recipient: 1989-1995

Page 1 of 5

Field	1989	1990	1991	1992	1993	1994	1995
	Total, all recipients						
Total science and engineering	337,431	345,793	356,785	376,933	388,435	395,380	399,809
Engineering	66,947	64,703	62,186	61,898	62,670	62,962	63,330
Sciences	270,484	281,090	294,599	315,035	325,765	332,418	336,479
Natural sciences	109,350	105,234	105,595	111,108	116,742	122,792	129,447
Physical science [1]	17,329	16,203	16,407	17,076	17,691	18,525	19,375
Mathematical science	15,314	14,674	14,784	14,851	14,870	14,431	13,759
Computer science	30,963	27,695	25,410	24,854	24,477	24,458	24,662
Biological science	36,949	38,040	40,351	43,835	47,877	52,213	56,804
Agricultural science	8,795	8,622	8,643	10,492	11,827	13,165	14,847
Social sciences	161,134	175,856	189,004	203,927	209,023	209,626	207,032
Social science	112,180	121,838	130,111	139,884	141,772	139,858	134,431
Psychology	48,954	54,018	58,893	64,043	67,251	69,768	72,601
Non-S&E [2]	692,740	716,358	751,212	773,139	790,843	787,761	774,627
Grand total	1,030,171	1,062,151	1,107,997	1,150,072	1,179,278	1,183,141	1,174,436
	U.S. citizens and permanent residents, total [3]						
Total science and engineering	325,108	333,475	344,061	364,695	374,633	381,451	385,055
Engineering	61,875	59,786	57,604	57,675	58,165	58,422	58,520
Sciences	263,233	273,689	286,457	307,020	316,468	323,029	326,535
Natural sciences	104,928	100,908	101,039	106,739	111,656	117,843	124,297
Physical science [1]	16,724	15,608	15,799	16,469	16,927	17,812	18,652
Mathematical science	14,771	14,150	14,206	14,259	14,318	13,869	13,166
Computer science	28,828	25,629	23,373	22,880	22,273	22,185	22,367
Biological science	36,076	37,173	39,288	42,842	46,660	51,058	55,523
Agricultural science	8,529	8,348	8,373	10,289	11,478	12,919	14,589
Social sciences	158,305	172,781	185,418	200,281	204,812	205,186	202,238
Social science	109,862	119,288	127,216	136,902	138,391	136,273	130,579
Psychology	48,443	53,493	58,202	63,379	66,421	68,913	71,659
Non-S&E [2]	678,606	702,123	734,279	756,830	772,274	767,463	752,369
Grand total	1,003,714	1,035,598	1,078,340	1,121,525	1,146,907	1,148,914	1,137,424

See explanatory information and SOURCES at end of table.

Appendix table 3-1. Number of earned bachelor's degrees, by field and by race/ethnicity of recipient: 1989-1995

Page 2 of 5

Field	1989	1990	1991	1992	1993	1994	1995
	White, non-Hispanics						
Total science and engineering	266,862	270,225	278,190	292,614	297,171	297,616	294,773
Engineering	50,081	47,494	45,162	45,026	44,853	44,687	43,726
Sciences	216,781	222,731	233,028	247,588	252,318	252,929	251,047
Natural sciences	84,578	80,210	80,111	84,133	87,401	91,196	94,575
Physical science [1]	14,238	13,055	13,145	13,678	13,941	14,616	14,952
Mathematical science	12,287	11,765	11,649	11,723	11,669	11,089	10,343
Computer science	21,711	18,918	17,349	16,844	16,155	15,816	15,532
Biological science	28,404	28,814	30,264	32,506	35,080	37,942	40,628
Agricultural science	7,938	7,658	7,704	9,382	10,556	11,733	13,120
Social sciences	132,203	142,521	152,917	163,455	164,917	161,733	156,472
Social science	91,697	98,385	104,783	111,389	111,154	106,863	100,558
Psychology	40,506	44,136	48,134	52,066	53,763	54,870	55,914
Non-S&E [2]	573,464	586,461	614,173	628,839	634,432	620,508	598,012
Grand total	840,326	856,686	892,363	921,453	931,603	918,124	892,785
	Asians						
Total science and engineering	19,138	19,437	20,552	22,635	24,504	26,420	29,128
Engineering	6,075	6,012	6,220	6,265	6,407	6,516	6,785
Sciences	13,063	13,425	14,332	16,370	18,097	19,904	22,343
Natural sciences	7,260	7,326	7,595	8,496	9,524	10,401	12,007
Physical science [1]	922	937	983	1,001	1,098	1,096	1,347
Mathematical science	1,019	874	915	857	915	926	965
Computer science	2,268	2,144	2,010	2,082	2,245	2,247	2,365
Biological science	2,907	3,245	3,559	4,402	5,103	5,959	7,043
Agricultural science	144	126	128	154	163	173	287
Social sciences	5,803	6,099	6,737	7,874	8,573	9,503	10,336
Social science	4,228	4,469	4,852	5,724	6,035	6,726	7,005
Psychology	1,575	1,630	1,885	2,150	2,538	2,777	3,331
Non-S&E [2]	18,435	18,590	21,173	23,981	26,083	28,255	30,167
Grand total	37,573	38,027	41,725	46,616	50,587	54,675	59,295

See explanatory information and SOURCES at end of table.

Appendix table 3-1. Number of earned bachelor's degrees, by field and by race/ethnicity of recipient: 1989-1995

Page 3 of 5

Field	1989	1990	1991	1992	1993	1994	1995
	Underrepresented minorities, total						
Total science and engineering	31,950	33,419	36,682	41,383	44,682	48,822	51,844
Engineering	4,805	4,729	4,953	5,277	5,714	6,020	6,717
Sciences	27,145	28,690	31,729	36,106	38,968	42,802	45,127
Natural sciences	10,830	10,530	10,960	11,722	12,510	13,782	14,815
Physical science [1]	1,322	1,245	1,355	1,425	1,528	1,737	1,932
Mathematical science	1,218	1,178	1,334	1,432	1,490	1,594	1,589
Computer science	3,742	3,416	3,292	3,342	3,390	3,611	3,915
Biological science	4,151	4,243	4,551	5,043	5,602	6,127	6,606
Agricultural science	397	448	428	480	500	713	773
Social sciences	16,315	18,160	20,769	24,384	26,458	29,020	30,312
Social science	11,212	12,394	14,100	16,647	17,918	19,400	19,621
Psychology	5,103	5,766	6,669	7,737	8,540	9,620	10,691
Non-S&E [2]	70,215	73,958	81,840	88,065	95,404	102,241	106,588
Grand total	102,165	107,377	118,522	129,448	140,086	151,063	158,432
	Black, non-Hispanics						
Total science and engineering	17,385	18,230	19,987	22,431	24,421	26,289	27,528
Engineering	2,067	2,072	2,229	2,362	2,577	2,659	2,845
Sciences	15,318	16,158	17,758	20,069	21,844	23,630	24,683
Natural sciences	6,005	5,782	5,834	6,401	6,972	7,559	8,021
Physical science [1]	697	650	753	816	836	921	1,034
Mathematical science	792	720	811	904	965	992	995
Computer science	2,457	2,247	1,997	2,090	2,213	2,398	2,498
Biological science	1,916	1,994	2,111	2,385	2,739	2,980	3,231
Agricultural science	143	171	162	206	219	268	263
Social sciences	9,313	10,376	11,924	13,668	14,872	16,071	16,662
Social science	6,570	7,226	8,236	9,489	10,254	10,835	10,921
Psychology	2,743	3,150	3,688	4,179	4,618	5,236	5,741
Non-S&E [2]	39,452	41,071	45,022	48,880	52,246	56,027	57,759
Grand total	56,837	59,301	65,009	71,311	76,667	82,316	85,287

See explanatory information and SOURCES at end of table.

Appendix table 3-1. Number of earned bachelor's degrees, by field and by race/ethnicity of recipient: 1989-1995

Field	1989	1990	1991	1992	1993	1994	1995
	Hispanics						
Total science and engineering	13,327	13,918	15,351	17,391	18,442	20,529	22,190
Engineering	2,561	2,511	2,566	2,733	2,961	3,143	3,651
Sciences	10,766	11,407	12,785	14,658	15,481	17,386	18,539
Natural sciences	4,417	4,357	4,705	4,892	5,034	5,648	6,119
Physical science [1]	563	522	533	546	599	733	800
Mathematical science	373	413	480	482	470	543	536
Computer science	1,195	1,085	1,215	1,173	1,096	1,135	1,307
Biological science	2,090	2,119	2,264	2,477	2,652	2,901	3,090
Agricultural science	196	218	213	214	217	336	386
Social sciences	6,349	7,050	8,080	9,766	10,447	11,738	12,420
Social science	4,197	4,645	5,334	6,519	6,860	7,748	7,877
Psychology	2,152	2,405	2,746	3,247	3,587	3,990	4,543
Non-S&E [2]	28,034	29,946	33,676	35,616	39,403	42,154	44,501
Grand total	41,361	43,864	49,027	53,007	57,845	62,683	66,691
	American Indians or Alaskan Natives						
Total science and engineering	1,238	1,271	1,344	1,561	1,819	2,004	2,126
Engineering	177	146	158	182	176	218	221
Sciences	1,061	1,125	1,186	1,379	1,643	1,786	1,905
Natural sciences	408	391	421	429	504	575	675
Physical science [1]	62	73	69	63	93	83	98
Mathematical science	53	45	43	46	55	59	58
Computer science	90	84	80	79	81	78	110
Biological science	145	130	176	181	211	246	285
Agricultural science	58	59	53	60	64	109	124
Social sciences	653	734	765	950	1,139	1,211	1,230
Social science	445	523	530	639	804	817	823
Psychology	208	211	235	311	335	394	407
Non-S&E [2]	2,729	2,941	3,142	3,569	3,755	4,060	4,328
Grand total	3,967	4,212	4,486	5,130	5,574	6,064	6,454

See explanatory information and SOURCES at end of table.

Appendix table 3-1. Number of earned bachelor's degrees, by field and by race/ethnicity of recipient: 1989-1995

Page 5 of 5

Field	1989	1990	1991	1992	1993	1994	1995
	U.S. citizens and permanent residents, unknown race/ethnicity						
Total science and engineering	7,158	10,394	8,637	8,063	8,276	8,593	9,310
Engineering	914	1,551	1,269	1,107	1,191	1,199	1,292
Sciences	6,244	8,843	7,368	6,956	7,085	7,394	8,018
Natural sciences	2,260	2,842	2,373	2,388	2,221	2,464	2,900
Physical science [1]	242	371	316	365	360	363	421
Mathematical science	247	333	308	247	244	260	269
Computer science	1,107	1,151	722	612	483	511	555
Biological science	614	871	914	891	875	1,030	1,246
Agricultural science	50	116	113	273	259	300	409
Social sciences	3,984	6,001	4,995	4,568	4,864	4,930	5,118
Social science	2,725	4,040	3,481	3,142	3,284	3,284	3,395
Psychology	1,259	1,961	1,514	1,426	1,580	1,646	1,723
Non-S&E [2]	16,492	23,114	17,093	15,945	16,355	16,459	17,602
Grand total	23,650	33,508	25,730	24,008	24,631	25,052	26,912
	Nonresident aliens [4]						
Total science and engineering	12,323	12,318	12,724	12,238	13,802	13,929	14,754
Engineering	5,072	4,917	4,582	4,223	4,505	4,540	4,810
Sciences	7,251	7,401	8,142	8,015	9,297	9,389	9,944
Natural sciences	4,422	4,326	4,556	4,369	5,086	4,949	5,150
Physical science [1]	605	595	608	607	764	713	723
Mathematical science	543	524	578	592	552	562	593
Computer science	2,135	2,066	2,037	1,974	2,204	2,273	2,295
Biological science	873	867	1,063	993	1,217	1,155	1,281
Agricultural science	266	274	270	203	349	246	258
Social sciences	2,829	3,075	3,586	3,646	4,211	4,440	4,794
Social science	2,318	2,550	2,895	2,982	3,381	3,585	3,852
Psychology	511	525	691	664	830	855	942
Non-S&E [2]	14,134	14,235	16,933	16,309	18,569	20,298	22,258
Grand total	26,457	26,553	29,657	28,547	32,371	34,227	37,012

[1] In this table, "Physical science" includes earth, atmospheric, and ocean sciences, as well as physics, astronomy, and chemistry.

[2] Non-S&E refers to non-science and non-engineering.

[3] Racial/ethnic categories are as designated on the survey form. These categories include U.S. citizens and foreign citizens on permanent visas (i.e., resident aliens who have been admitted for permanent residency).

[4] Nonresident aliens include foreign citizens on temporary visas only. No racial/ethnic data are collected for this group.

NOTES: Data on race/ethnicity were collected on broad fields of study only until 1994; therefore, these trend data could not be adjusted to the exact field taxonomies used by NSF.

SOURCE: Tabulations by National Science Foundation/SRS; data from National Center for Education Statistics IPEDS Completions Surveys, 1989-1995.

Appendix table 3-2. Bachelor's degrees awarded to women, by major field group: 1966-1995

Year	All fields	Science and engineering fields								All other fields
		Total	Engineering	Physical sciences	Earth, atmospheric, and ocean sciences	Mathematical/ computer sciences	Biological/ agricultural	Psychology	Social sciences	
1966	222,971	45,634	146	2,172	161	6,702	7,465	6,928	22,060	177,337
1967	238,133	50,787	184	2,205	197	7,334	7,948	7,778	25,141	187,346
1968	277,116	61,397	216	2,435	234	8,841	8,966	10,130	30,575	215,719
1969	321,138	72,917	312	2,661	291	10,348	10,090	12,700	36,515	248,221
1970	344,465	79,702	337	2,626	343	10,516	10,700	14,717	40,463	264,763
1971	367,687	85,039	361	2,631	383	9,818	11,016	17,037	43,793	282,648
1972	390,479	90,037	492	2,653	495	9,784	11,777	20,154	44,682	300,442
1973	408,738	95,995	576	2,589	532	9,985	13,779	22,986	45,548	312,743
1974	423,469	102,578	698	2,767	768	9,719	16,732	26,407	45,487	320,891
1975	423,239	102,814	845	3,011	827	8,656	19,384	27,103	42,988	320,425
1976	425,894	103,921	1,317	3,217	922	7,678	21,836	27,376	41,575	321,973
1977	429,107	104,993	2,044	3,377	1,174	7,488	23,250	27,102	40,558	324,114
1978	439,135	107,667	3,482	3,690	1,294	7,110	24,363	26,540	41,188	331,468
1979	449,946	109,915	4,881	3,899	1,387	7,421	24,787	26,363	41,177	340,031
1980	462,501	113,480	5,952	4,185	1,462	8,247	25,011	26,923	41,700	349,021
1981	472,541	115,815	7,063	4,309	1,666	9,734	24,657	26,917	41,469	356,726
1982	486,500	121,399	8,275	4,526	1,807	12,173	24,313	27,783	42,522	365,101
1983	497,284	123,191	9,652	4,611	1,848	14,542	24,279	27,597	40,662	374,093
1984	499,595	125,134	10,729	4,656	1,934	18,053	23,243	27,426	39,093	374,461
1985	504,217	128,871	11,246	4,836	1,861	21,525	23,140	27,422	38,841	375,346
1986	510,061	130,662	11,138	4,696	1,354	22,806	22,953	28,246	39,469	379,399
1987	518,529	131,545	11,404	4,672	1,060	21,571	22,403	29,796	40,639	386,984
1988	524,797	130,933	10,779	4,582	847	18,765	22,375	31,794	41,791	393,864
1989	542,605	133,483	10,188	4,371	801	16,595	21,679	34,663	45,186	409,122
1990	566,284	140,012	9,973	4,319	775	15,185	22,401	38,619	48,740	426,272
1991	599,045	148,347	9,665	4,425	782	14,494	23,776	42,738	52,467	450,698
1992	624,677	159,486	9,636	4,586	1,024	14,196	26,720	46,903	56,421	465,191
1993	641,742	165,720	9,981	4,764	1,050	13,950	29,182	49,222	57,571	476,022
1994	646,080	170,977	10,403	5,067	1,203	13,788	31,921	51,019	57,576	475,103
1995	643,290	175,931	10,950	5,292	1,524	13,554	35,555	52,963	56,093	467,359

See explanatory information and SOURCES at end of table.

Appendix table 3-2. Bachelor's degrees awarded to women, by major field group: 1966-1995

[Percentage distribution of bachelor's degrees awarded to women]

Page 2 of 3

Year	All fields	Science and engineering fields								All other fields
		Total	Engineering	Physical sciences	Earth, atmospheric, and ocean sciences	Mathematical/ computer sciences	Biological/ agricultural	Psychology	Social sciences	
1966	100.0	20.5	0.1	1.0	0.1	3.0	3.3	3.1	9.9	79.5
1967	100.0	21.3	0.1	0.9	0.1	3.1	3.3	3.3	10.6	78.7
1968	100.0	22.2	0.1	0.9	0.1	3.2	3.2	3.7	11.0	77.8
1969	100.0	22.7	0.1	0.8	0.1	3.2	3.1	4.0	11.4	77.3
1970	100.0	23.1	0.1	0.8	0.1	3.1	3.1	4.3	11.7	76.9
1971	100.0	23.1	0.1	0.7	0.1	2.7	3.0	4.6	11.9	76.9
1972	100.0	23.1	0.1	0.7	0.1	2.5	3.0	5.2	11.4	76.9
1973	100.0	23.5	0.1	0.6	0.1	2.4	3.4	5.6	11.1	76.5
1974	100.0	24.2	0.2	0.7	0.2	2.3	4.0	6.2	10.7	75.8
1975	100.0	24.3	0.2	0.7	0.2	2.0	4.6	6.4	10.2	75.7
1976	100.0	24.4	0.3	0.8	0.2	1.8	5.1	6.4	9.8	75.6
1977	100.0	24.5	0.5	0.8	0.3	1.7	5.4	6.3	9.5	75.5
1978	100.0	24.5	0.8	0.8	0.3	1.6	5.5	6.0	9.4	75.5
1979	100.0	24.4	1.1	0.9	0.3	1.6	5.5	5.9	9.2	75.6
1980	100.0	24.5	1.3	0.9	0.3	1.8	5.4	5.8	9.0	75.5
1981	100.0	24.5	1.5	0.9	0.4	2.1	5.2	5.7	8.8	75.5
1982	100.0	25.0	1.7	0.9	0.4	2.5	5.0	5.7	8.7	75.0
1983	100.0	24.8	1.9	0.9	0.4	2.9	4.9	5.5	8.2	75.2
1984	100.0	25.0	2.1	0.9	0.4	3.6	4.7	5.5	7.8	75.0
1985	100.0	25.6	2.2	1.0	0.4	4.3	4.6	5.4	7.7	74.4
1986	100.0	25.6	2.2	0.9	0.3	4.5	4.5	5.5	7.7	74.4
1987	100.0	25.4	2.2	0.9	0.2	4.2	4.3	5.7	7.8	74.6
1988	100.0	24.9	2.1	0.9	0.2	3.6	4.3	6.1	8.0	75.1
1989	100.0	24.6	1.9	0.8	0.1	3.1	4.0	6.4	8.3	75.4
1990	100.0	24.7	1.8	0.8	0.1	2.7	4.0	6.8	8.6	75.3
1991	100.0	24.8	1.6	0.7	0.1	2.4	4.0	7.1	8.8	75.2
1992	100.0	25.5	1.5	0.7	0.2	2.3	4.3	7.5	9.0	74.5
1993	100.0	25.8	1.6	0.7	0.2	2.2	4.5	7.7	9.0	74.2
1994	100.0	26.5	1.6	0.8	0.2	2.1	4.9	7.9	8.9	73.5
1995	100.0	27.3	1.7	0.8	0.2	2.1	5.5	8.2	8.7	72.7

See explanatory information and SOURCES at end of table.

Appendix table 3-2. Bachelor's degrees awarded to women, by major field group: 1966-1995

[Women as a percentage of all bachelor's recipients]

Page 3 of 3

Year	All fields	Science and engineering fields								All other fields
		Total	Engineering	Physical sciences	Earth, atmospheric, and ocean sciences	Mathematical/ computer sciences	Biological/ agricultural	Psychology	Social sciences	
1966	42.6	24.8	0.4	14.0	9.4	33.2	25.0	40.8	34.3	52.2
1967	42.3	25.4	0.5	13.9	10.2	34.1	24.5	40.0	34.7	51.7
1968	43.5	27.1	0.6	14.3	10.0	36.7	24.8	42.3	35.8	52.6
1969	43.8	27.8	0.8	14.3	10.0	36.6	24.4	43.1	36.5	52.6
1970	43.2	28.0	0.8	14.5	10.2	36.1	24.1	43.6	36.6	51.5
1971	43.5	28.9	0.8	14.7	10.8	36.0	24.1	44.7	37.6	51.2
1972	43.7	29.4	1.1	15.8	12.2	35.9	24.4	46.4	37.0	51.1
1973	43.9	29.9	1.2	15.8	12.2	36.3	25.2	47.8	37.0	51.3
1974	44.4	31.4	1.6	16.8	15.9	36.6	27.0	50.5	37.6	51.1
1975	45.4	32.8	2.1	18.8	17.0	37.0	29.2	52.7	38.5	51.8
1976	45.6	33.6	3.4	19.5	18.3	35.3	31.2	54.4	38.8	51.5
1977	46.2	34.6	4.9	19.9	20.8	36.1	32.9	56.7	40.3	51.9
1978	47.2	35.5	7.4	21.5	21.6	35.7	35.2	58.9	41.6	52.9
1979	48.3	36.3	9.1	22.6	22.8	35.9	37.1	61.3	42.9	54.1
1980	49.2	37.2	10.1	24.0	23.8	36.4	39.1	63.3	44.8	54.9
1981	49.9	37.8	11.1	24.7	24.9	36.9	41.1	65.1	45.4	55.7
1982	50.5	38.5	12.3	26.2	25.6	37.9	42.3	66.9	46.2	56.3
1983	50.7	38.8	13.3	28.5	25.3	38.9	43.8	67.6	46.3	56.4
1984	50.7	38.6	14.1	29.4	24.4	39.3	44.4	67.9	45.6	56.6
1985	50.9	38.8	14.5	29.7	24.6	39.5	45.1	68.2	45.8	57.0
1986	51.0	39.0	14.5	29.8	22.3	38.8	45.5	69.0	45.6	57.1
1987	51.7	39.7	15.3	30.2	22.6	38.2	46.1	69.0	45.8	57.6
1988	52.2	40.6	15.4	32.1	23.8	36.9	47.7	70.1	45.8	57.6
1989	52.7	41.3	15.2	30.9	25.2	35.9	47.6	70.8	46.2	57.8
1990	53.3	42.5	15.4	32.2	27.9	35.8	48.2	71.5	46.3	58.1
1991	54.1	43.9	15.5	32.4	28.7	36.1	48.7	72.6	47.2	58.5
1992	54.3	44.9	15.6	33.1	32.0	35.6	49.3	73.2	47.8	58.5
1993	54.4	45.3	15.9	33.6	30.0	35.4	48.9	73.2	48.2	58.5
1994	54.6	45.8	16.5	34.6	31.1	35.2	48.9	73.1	49.0	58.7
1995	54.8	46.5	17.3	35.5	34.0	35.1	49.7	73.0	49.8	58.7

NOTE: For the years 1966-1970, the science and engineering total includes degrees granted for "other" science; these degrees are not included in any of the specific categories. These degrees constitute less than 2 percent of the total.

SOURCES: Tabulations by National Science Foundation/SRS; data from National Center for Education Statistics: Survey of Degrees and Other Formal Awards Conferred, and Completions Survey.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 3-3. Bachelor's degrees awarded to men, by major field group: 1967-1995

Page 1 of 2

Year	All fields	Science and engineering fields								All other fields
		Total	Engineering	Physical sciences	Earth, atmospheric, and ocean sciences	Mathematical/ computer sciences	Biological/ agricultural	Psychology	Social sciences	
1967	324,236	149,045	36,013	13,642	1,739	14,196	24,541	11,657	47,257	175,191
1968	359,747	165,200	37,464	14,602	2,105	15,243	27,175	13,791	54,820	194,547
1969	412,865	189,272	41,270	15,962	2,633	17,915	31,190	16,758	63,544	223,593
1970	453,605	204,528	44,433	15,547	3,008	18,593	33,747	19,067	70,133	249,077
1971	478,423	209,318	44,887	15,317	3,179	17,488	34,712	21,117	72,618	269,105
1972	503,631	216,422	45,219	14,161	3,560	17,466	36,514	23,267	76,235	287,209
1973	521,534	225,090	46,203	13,826	3,842	17,543	40,908	25,110	77,658	296,444
1974	530,907	223,652	42,550	13,686	4,055	16,851	45,174	25,849	75,487	307,255
1975	508,424	210,741	38,979	12,990	4,050	14,729	46,937	24,333	68,723	297,683
1976	508,549	205,570	37,473	13,280	4,124	14,071	48,168	22,987	65,467	302,979
1977	499,121	198,805	39,313	13,560	4,479	13,241	47,339	20,692	60,181	300,316
1978	491,066	195,888	43,769	13,453	4,709	12,815	44,852	18,517	57,773	295,178
1979	481,394	193,247	48,588	13,358	4,695	13,249	41,994	16,649	54,714	288,147
1980	477,750	191,215	52,858	13,285	4,693	14,439	38,931	15,590	51,419	286,535
1981	474,336	190,977	56,654	13,137	5,028	16,672	35,265	14,447	49,774	283,359
1982	477,543	193,624	59,185	12,737	5,254	19,966	33,222	13,756	49,504	283,919
1983	483,395	194,380	63,018	11,586	5,450	22,802	31,132	13,228	47,164	289,015
1984	486,750	199,150	65,424	11,175	5,991	27,893	29,108	12,949	46,610	287,600
1985	486,660	203,402	66,326	11,434	5,715	32,985	28,172	12,815	45,955	283,258
1986	490,143	204,743	65,682	11,088	4,722	35,920	27,488	12,691	47,152	285,400
1987	485,003	199,981	63,021	10,792	3,629	34,871	26,168	13,399	48,101	285,022
1988	481,236	191,549	59,375	9,673	2,707	32,112	24,550	13,584	49,548	289,687
1989	487,566	189,338	56,759	9,777	2,380	29,682	23,852	14,291	52,597	298,228
1990	495,867	189,082	54,732	9,106	2,001	27,184	24,050	15,399	56,610	306,785
1991	508,952	189,328	52,522	9,253	1,946	25,700	25,007	16,155	58,745	319,624
1992	525,395	195,779	52,305	9,289	2,177	25,693	27,473	17,130	61,712	329,616
1993	537,536	200,315	52,724	9,424	2,453	25,483	30,439	18,029	61,763	337,221
1994	537,061	202,284	52,609	9,588	2,665	25,397	33,347	18,749	59,929	334,777
1995	531,146	202,217	52,421	9,605	2,954	25,066	35,915	19,638	56,618	328,929

See explanatory information and SOURCES at end of table.

Appendix table 3-3. Bachelor's degrees awarded to men, by major field group: 1966-1995

[Percent distribution]

Page 2 of 2

Year	All fields	Science and engineering fields: Total	Engineering	Physical sciences	Earth, atmospheric, and ocean sciences	Mathematical/ computer sciences	Biological/ agricultural	Psychology	Social sciences	All other fields
1966	100.0	46.1	11.9	4.4	0.5	4.5	7.4	3.3	14.1	53.9
1967	100.0	46.0	11.1	4.2	0.5	4.4	7.6	3.6	14.6	54.0
1968	100.0	45.9	10.4	4.1	0.6	4.2	7.6	3.8	15.2	54.1
1969	100.0	45.8	10.0	3.9	0.6	4.3	7.6	4.1	15.4	54.2
1970	100.0	45.1	9.8	3.4	0.7	4.1	7.4	4.2	15.5	54.9
1971	100.0	43.8	9.4	3.2	0.7	3.7	7.3	4.4	15.2	56.2
1972	100.0	43.0	9.0	2.8	0.7	3.5	7.3	4.6	15.1	57.0
1973	100.0	43.2	8.9	2.7	0.7	3.4	7.8	4.8	14.9	56.8
1974	100.0	42.1	8.0	2.6	0.8	3.2	8.5	4.9	14.2	57.9
1975	100.0	41.4	7.7	2.6	0.8	2.9	9.2	4.8	13.5	58.6
1976	100.0	40.4	7.4	2.6	0.8	2.8	9.5	4.5	12.9	59.6
1977	100.0	39.8	7.9	2.7	0.9	2.7	9.5	4.1	12.1	60.2
1978	100.0	39.9	8.9	2.7	1.0	2.6	9.1	3.8	11.8	60.1
1979	100.0	40.1	10.1	2.8	1.0	2.8	8.7	3.5	11.4	59.9
1980	100.0	40.0	11.1	2.8	1.0	3.0	8.1	3.3	10.8	60.0
1981	100.0	40.3	11.9	2.8	1.1	3.5	7.4	3.0	10.5	59.7
1982	100.0	40.5	12.4	2.7	1.1	4.2	7.0	2.9	10.4	59.5
1983	100.0	40.2	13.0	2.4	1.1	4.7	6.4	2.7	9.8	59.8
1984	100.0	40.9	13.4	2.3	1.2	5.7	6.0	2.7	9.6	59.1
1985	100.0	41.8	13.6	2.3	1.2	6.8	5.8	2.6	9.4	58.2
1986	100.0	41.8	13.4	2.3	1.0	7.3	5.6	2.6	9.6	58.2
1987	100.0	41.2	13.0	2.2	0.7	7.2	5.4	2.8	9.9	58.8
1988	100.0	39.8	12.3	2.0	0.6	6.7	5.1	2.8	10.3	60.2
1989	100.0	38.8	11.6	2.0	0.5	6.1	4.9	2.9	10.8	61.2
1990	100.0	38.1	11.0	1.8	0.4	5.5	4.9	3.1	11.4	61.9
1991	100.0	37.2	10.3	1.8	0.4	5.0	4.9	3.2	11.5	62.8
1992	100.0	37.3	10.0	1.8	0.4	4.9	5.2	3.3	11.7	62.7
1993	100.0	37.3	9.8	1.8	0.5	4.7	5.7	3.4	11.5	62.7
1994	100.0	37.7	9.8	1.8	0.5	4.7	6.2	3.5	11.2	62.3
1995	100.0	38.1	9.9	1.8	0.6	4.7	6.8	3.7	10.7	61.9

NOTES: For the years 1966-1970 the science and engineering total includes degrees granted for "other" science; these degrees are not included in any of the specific categories. These degrees constitute less than 2 percent of the total. Because of rounding, details may not sum to totals.

SOURCES: Tabulations by National Science Foundation/SRS; data from National Center for Education Statistics: Survey of Degrees and Other Formal Awards Conferred, and Completions Survey.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 3-4. Number of earned bachelor's degrees, by field and by race/ethnicity of male recipients: 1989–1995

Field	1989	1990	1991	1992	1993	1994	1995
	Total, all recipients						
Total science and engineering	198,728	199,916	201,499	209,270	214,388	216,492	216,078
Engineering	56,759	54,730	52,522	52,270	52,696	52,569	52,389
Sciences	141,969	145,186	148,977	157,000	161,692	163,923	163,689
Natural sciences	65,875	62,518	62,091	64,678	67,855	70,956	73,593
Physical science [1]	12,157	11,109	11,199	11,466	11,877	12,253	12,559
Mathematical science	8,264	7,863	7,804	7,923	7,859	7,754	7,318
Computer science	21,418	19,321	17,896	17,670	17,565	17,466	17,628
Biological science	18,295	18,631	19,715	21,107	23,111	25,314	26,956
Agricultural science	5,741	5,594	5,477	6,512	7,443	8,169	9,132
Social sciences	76,094	82,668	86,886	92,322	93,837	92,967	90,096
Social science	61,803	67,269	70,731	75,185	75,808	74,218	70,458
Psychology	14,291	15,399	16,155	17,137	18,029	18,749	19,638
Non-S&E [2]	288,838	295,951	307,453	316,125	323,148	320,569	315,068
Grand total	487,566	495,867	508,952	525,395	537,536	537,061	531,146
	U.S. citizens and permanent residents, total [3]						
Total science and engineering	189,685	190,980	192,516	200,929	204,994	207,030	206,144
Engineering	52,160	50,303	48,410	48,518	48,655	48,577	48,145
Sciences	137,525	140,677	144,106	152,411	156,339	158,453	157,999
Natural sciences	62,973	59,662	59,096	61,872	64,584	67,726	70,302
Physical science [1]	11,751	10,694	10,788	11,049	11,352	11,786	12,086
Mathematical science	7,917	7,539	7,430	7,565	7,514	7,390	6,960
Computer science	19,901	17,849	16,433	16,251	15,964	15,799	15,960
Biological science	17,869	18,200	19,171	20,628	22,542	24,739	26,334
Agricultural science	5,535	5,380	5,274	6,379	7,212	8,012	8,962
Social sciences	74,552	81,015	85,010	90,539	91,755	90,727	87,697
Social science	60,431	65,776	69,033	73,577	73,946	72,185	68,291
Psychology	14,121	15,239	15,977	16,962	17,809	18,542	19,406
Non-S&E [2]	280,764	287,979	298,209	307,360	313,490	310,288	303,886
Grand total	470,449	478,959	490,725	508,289	518,484	517,318	510,030

See explanatory information and SOURCES at end of table.

Appendix table 3-4. Number of earned bachelor's degrees, by field and by race/ethnicity of male recipients: 1989–1995

Field	1989	1990	1991	1992	1993	1994	1995
	White, non-Hispanics						
Total science and engineering	158,590	157,675	158,687	164,220	166,063	165,245	161,731
Engineering	42,779	40,533	38,692	38,513	38,244	37,830	36,785
Sciences	115,811	117,142	119,995	125,707	127,819	127,415	124,946
Natural sciences	52,132	48,848	48,304	50,126	52,048	54,115	55,197
Physical science [1]	10,173	9,179	9,203	9,430	9,614	9,958	10,006
Mathematical science	6,598	6,253	6,119	6,255	6,131	5,920	5,456
Computer science	15,799	13,974	12,916	12,571	12,329	12,022	11,793
Biological science	14,377	14,488	15,174	16,030	17,293	18,882	19,790
Agricultural science	5,185	4,954	4,892	5,840	6,681	7,333	8,152
Social sciences	63,679	68,294	71,691	75,581	75,771	73,300	69,749
Social science	51,766	55,662	58,414	61,574	61,269	58,409	54,508
Psychology	11,913	12,632	13,277	14,007	14,502	14,891	15,241
Non-S&E [2]	239,962	243,349	252,058	258,297	261,177	254,966	245,424
Grand total	398,552	401,024	410,745	422,517	427,240	420,211	407,155
	Asians						
Total science and engineering	11,578	11,528	11,942	13,198	14,132	14,967	16,039
Engineering	4,936	4,827	4,969	5,067	5,130	5,235	5,340
Sciences	6,642	6,701	6,973	8,131	9,002	9,732	10,699
Natural sciences	4,073	4,054	4,149	4,783	5,380	5,721	6,483
Physical science [1]	626	592	606	615	675	648	784
Mathematical science	527	491	482	486	502	523	519
Computer science	1,420	1,335	1,268	1,373	1,492	1,476	1,583
Biological science	1,442	1,573	1,736	2,230	2,633	2,992	3,467
Agricultural science	58	63	57	79	78	82	130
Social sciences	2,569	2,647	2,824	3,348	3,622	4,011	4,216
Social science	2,065	2,156	2,260	2,728	2,884	3,204	3,247
Psychology	504	491	564	620	738	807	969
Non-S&E [2]	7,625	7,569	8,831	9,992	10,687	11,453	12,309
Grand total	19,203	19,097	20,773	23,190	24,819	26,420	28,348

See explanatory information and SOURCES at end of table.

Appendix table 3-4. Number of earned bachelor's degrees, by field and by race/ethnicity of male recipients: 1989–1995

Page 3 of 5

Field	1989	1990	1991	1992	1993	1994	1995
	Underrepresented minorities, total						
Total science and engineering	15,672	15,954	17,027	18,890	20,160	22,001	23,235
Engineering	3,638	3,574	3,654	3,952	4,261	4,458	4,917
Sciences	12,034	12,380	13,373	14,938	15,899	17,543	18,318
Natural sciences	5,411	5,043	5,226	5,450	5,766	6,389	6,888
Physical science [1]	771	655	755	745	792	931	998
Mathematical science	636	614	657	675	744	786	820
Computer science	2,013	1,797	1,758	1,864	1,802	1,939	2,190
Biological science	1,734	1,685	1,799	1,885	2,130	2,337	2,449
Agricultural science	257	292	257	281	298	396	431
Social sciences	6,623	7,337	8,147	9,488	10,133	11,154	11,430
Social science	5,286	5,788	6,442	7,590	8,013	8,813	8,742
Psychology	1,337	1,549	1,705	1,898	2,120	2,341	2,688
Non-S&E [2]	25,978	27,093	29,887	31,805	34,440	36,527	38,307
Grand total	41,650	43,047	46,914	50,695	54,600	58,528	61,542
	Black, non-Hispanics						
Total science and engineering	7,685	7,830	8,448	9,375	10,099	10,806	11,127
Engineering	1,397	1,416	1,484	1,614	1,764	1,784	1,846
Sciences	6,288	6,414	6,964	7,761	8,335	9,022	9,281
Natural sciences	2,732	2,476	2,538	2,709	2,872	3,146	3,314
Physical science [1]	365	292	391	381	370	464	495
Mathematical science	374	342	380	374	444	457	476
Computer science	1,205	1,074	971	1,092	1,049	1,161	1,241
Biological science	700	658	696	749	883	927	981
Agricultural science	88	110	100	113	126	137	121
Social sciences	3,556	3,938	4,426	5,052	5,463	5,876	5,967
Social science	2,911	3,144	3,547	4,070	4,364	4,644	4,565
Psychology	645	794	879	982	1,099	1,232	1,402
Non-S&E [2]	14,228	14,760	15,790	17,143	18,275	19,300	19,871
Grand total	21,913	22,590	24,238	26,518	28,374	30,106	30,998

See explanatory information and SOURCES at end of table.

Appendix table 3-4. Number of earned bachelor's degrees, by field and by race/ethnicity of male recipients: 1989–1995

Page 4 of 5

Field	1989	1990	1991	1992	1993	1994	1995
	Hispanics						
Total science and engineering	7,318	7,434	7,888	8,730	9,160	10,190	11,031
Engineering	2,100	2,035	2,039	2,187	2,355	2,495	2,895
Sciences	5,218	5,399	5,849	6,543	6,805	7,695	8,136
Natural sciences	2,432	2,328	2,458	2,497	2,608	2,925	3,196
Physical science [1]	362	311	318	326	361	415	437
Mathematical science	224	249	259	279	273	300	315
Computer science	750	669	738	724	700	719	876
Biological science	965	955	1,019	1,043	1,144	1,298	1,340
Agricultural science	131	144	124	125	130	193	228
Social sciences	2,786	3,071	3,391	4,046	4,197	4,770	4,940
Social science	2,153	2,384	2,634	3,220	3,269	3,774	3,774
Psychology	633	687	757	826	928	996	1,166
Non-S&E [2]	10,684	11,249	12,893	13,296	14,665	15,670	16,844
Grand total	18,002	18,683	20,781	22,026	23,825	25,860	27,875
	American Indians or Alaskan Natives						
Total science and engineering	669	690	691	785	901	1,005	1,077
Engineering	141	123	131	151	142	179	176
Sciences	528	567	560	634	759	826	901
Natural sciences	247	239	230	244	286	318	378
Physical science [1]	44	52	46	38	61	52	66
Mathematical science	38	23	18	22	27	29	29
Computer science	58	54	49	48	53	59	73
Biological science	69	72	84	93	103	112	128
Agricultural science	38	38	33	43	42	66	82
Social sciences	281	328	330	390	473	508	523
Social science	222	260	261	300	380	395	403
Psychology	59	68	69	90	93	113	120
Non-S&E [2]	1,066	1,084	1,204	1,366	1,500	1,557	1,592
Grand total	1,735	1,774	1,895	2,151	2,401	2,562	2,669

See explanatory information and SOURCES at end of table.

Appendix table 3-4. Number of earned bachelor's degrees, by field and by race/ethnicity of male recipients: 1989–1995

Page 5 of 5

Field	1989	1990	1991	1992	1993	1994	1995
	U.S. citizens and permanent residents, unknown race/ethnicity						
Total science and engineering	3,845	5,823	4,860	4,621	4,639	4,817	5,139
Engineering	807	1,369	1,095	986	1,020	1,054	1,103
Sciences	3,038	4,454	3,765	3,635	3,619	3,763	4,036
Natural sciences	1,357	1,717	1,417	1,513	1,390	1,501	1,734
Physical science [1]	181	268	224	259	271	249	298
Mathematical science	156	181	172	149	137	161	165
Computer science	669	743	491	443	341	362	394
Biological science	316	454	462	483	486	528	628
Agricultural science	35	71	68	179	155	201	249
Social sciences	1,681	2,737	2,348	2,122	2,229	2,262	2,302
Social science	1,314	2,170	1,917	1,685	1,780	1,759	1,794
Psychology	367	567	431	437	449	503	508
Non-S&E [2]	7,199	9,968	7,433	7,266	7,186	7,342	7,846
Grand total	11,044	15,791	12,293	11,887	11,825	12,159	12,985
	Nonresident aliens [4]						
Total science and engineering	9,043	8,936	8,983	8,341	9,394	9,462	9,934
Engineering	4,599	4,427	4,112	3,752	4,041	3,992	4,244
Sciences	4,444	4,509	4,871	4,589	5,353	5,470	5,690
Natural sciences	2,902	2,856	2,995	2,806	3,271	3,230	3,291
Physical science [1]	406	415	411	417	525	467	473
Mathematical science	347	324	374	358	345	364	358
Computer science	1,517	1,472	1,463	1,419	1,601	1,667	1,668
Biological science	426	431	544	479	569	575	622
Agricultural science	206	214	203	133	231	157	170
Social sciences	1,542	1,653	1,876	1,783	2,082	2,240	2,399
Social science	1,372	1,493	1,698	1,608	1,862	2,033	2,167
Psychology	170	160	178	175	220	207	232
Non-S&E [2]	8,074	7,972	9,244	8,765	9,658	10,281	11,182
Grand total	17,117	16,908	18,227	17,106	19,052	19,743	21,116

[1] In this table, "Physical science" includes earth, atmospheric, and ocean sciences, as well as physics, astronomy, and chemistry.

[2] Non-S&E refers to non-science and non-engineering.

[3] Racial/ethnic categories are as designated on the survey form. These categories include U.S. citizens and foreign citizens on permanent visas (i.e., resident aliens who have been admitted for permanent residency).

[4] Nonresident aliens include foreign citizens on temporary visas only. No racial/ethnic data are collected for this group.

NOTES: Data on race/ethnicity were collected on broad fields of study only until 1994; therefore, these trend data could not be adjusted to the exact field taxonomies used by NSF.

SOURCE: Tabulations by National Science Foundation/SRS; data from National Center for Education Statistics IPEDS Completions Surveys, 1989-95.

Appendix table 3-5. Number of earned bachelor's degrees, by field and by race/ethnicity of female recipients: 1989-1995

Field	1989	1990	1991	1992	1993	1994	1995
	Total, all recipients						
Total science and engineering	138,703	145,877	155,286	167,663	174,047	178,888	183,731
Engineering	10,188	9,973	9,664	9,628	9,974	10,393	10,941
Sciences	128,515	135,904	145,622	158,035	164,073	168,495	172,790
Natural sciences	43,475	42,716	43,504	46,430	48,887	51,836	55,854
Physical science [1]	5,172	5,094	5,208	5,610	5,814	6,272	6,816
Mathematical science	7,050	6,811	6,980	6,928	7,011	6,677	6,441
Computer science	9,545	.8,374	7,514	7,184	6,912	6,992	7,034
Biological science	18,654	19,409	20,636	22,728	24,766	26,899	29,848
Agricultural science	3,054	3,028	3,166	3,980	4,384	4,996	5,715
Social sciences	85,040	93,188	102,118	111,605	115,186	116,659	116,936
Social science	50,377	54,569	59,380	64,699	65,964	65,640	63,973
Psychology	34,663	38,619	42,738	46,906	49,222	51,019	52,963
Non-S&E [2]	403,902	420,407	443,759	457,014	467,695	467,192	459,559
Grand total	542,605	566,284	599,045	624,677	641,742	646,080	643,290
	U.S. citizens and permanent residents, total [3]						
Total science and engineering	135,423	142,495	151,545	163,766	169,639	174,421	178,911
Engineering	9,715	9,483	9,194	9,157	9,510	9,845	10,375
Sciences	125,708	133,012	142,351	154,609	160,129	164,576	168,536
Natural sciences	41,955	41,246	41,943	44,867	47,072	50,117	53,995
Physical science [1]	4,973	4,914	5,011	5,420	5,575	6,026	6,566
Mathematical science	6,854	6,611	6,776	6,694	6,804	6,479	6,206
Computer science	8,927	7,780	6,940	6,629	6,309	6,386	6,407
Biological science	18,207	18,973	20,117	22,214	24,118	26,319	29,189
Agricultural science	2,994	2,968	3,099	3,910	4,266	4,907	5,627
Social sciences	83,753	91,766	100,408	109,742	113,057	114,459	114,541
Social science	49,431	53,512	58,183	63,325	64,445	64,088	62,288
Psychology	34,322	38,254	42,225	46,417	48,612	50,371	52,253
Non-S&E [2]	397,842	414,144	436,070	449,470	458,784	457,175	448,483
Grand total	533,265	556,639	587,615	613,236	628,423	631,596	627,394

See explanatory information and SOURCES at end of table.

Appendix table 3-5. Number of earned bachelor's degrees, by field and by race/ethnicity of female recipients: 1989-1995

Page 2 of 5

Field	1989	1990	1991	1992	1993	1994	1995
	White, non-Hispanics						
Total science and engineering	108,272	112,550	119,503	128,394	131,108	132,371	133,042
Engineering	7,302	6,961	6,470	6,513	6,609	6,857	6,941
Sciences	100,970	105,589	113,033	121,881	124,499	125,514	126,101
Natural sciences	32,446	31,362	31,807	34,007	35,353	37,081	39,378
Physical science [1]	4,065	3,876	3,942	4,248	4,327	4,658	4,946
Mathematical science	5,689	5,512	5,530	5,468	5,538	5,169	4,887
Computer science	5,912	4,944	4,433	4,273	3,826	3,794	3,739
Biological science	14,027	14,326	15,090	16,476	17,787	19,060	20,838
Agricultural science	2,753	2,704	2,812	3,542	3,875	4,400	4,968
Social sciences	68,524	74,227	81,226	87,874	89,146	88,433	86,723
Social science	39,931	42,723	46,369	49,815	49,885	48,454	46,050
Psychology	28,593	31,504	34,857	38,059	39,261	39,979	40,673
Non-S&E [2]	333,502	343,112	362,115	370,542	373,255	365,542	352,588
Grand total	441,774	455,662	481,618	498,936	504,363	497,913	485,630
	Asians						
Total science and engineering	7,560	7,909	8,610	9,437	10,372	11,453	13,089
Engineering	1,139	1,185	1,251	1,198	1,277	1,281	1,445
Sciences	6,421	6,724	7,359	8,239	9,095	10,172	11,644
Natural sciences	3,187	3,272	3,446	3,713	4,144	4,680	5,524
Physical science [1]	296	345	377	386	423	448	563
Mathematical science	492	383	433	371	413	403	446
Computer science	848	809	742	709	753	771	782
Biological science	1,465	1,672	1,823	2,172	2,470	2,967	3,576
Agricultural science	86	63	71	75	85	91	157
Social sciences	3,234	3,452	3,913	4,526	4,951	5,492	6,120
Social science	2,163	2,313	2,592	2,996	3,151	3,522	3,758
Psychology	1,071	1,139	1,321	1,530	1,800	1,970	2,362
Non-S&E [2]	10,810	11,021	12,342	13,989	15,396	16,802	17,858
Grand total	18,370	18,930	20,952	23,426	25,768	28,255	30,947

See explanatory information and SOURCES at end of table.

Appendix table 3-5. Number of earned bachelor's degrees, by field and by race/ethnicity of female recipients: 1989-1995

Field	1989	1990	1991	1992	1993	1994	1995
	Underrepresented minorities, total						
Total science and engineering	16,278	17,465	19,655	22,493	24,522	26,821	28,609
Engineering	1,167	1,155	1,299	1,325	1,453	1,562	1,800
Sciences	15,111	16,310	18,356	21,168	23,069	25,259	26,809
Natural sciences	5,419	5,487	5,734	6,272	6,744	7,393	7,927
Physical science [1]	551	590	600	680	736	806	934
Mathematical science	582	564	677	757	746	808	769
Computer science	1,729	1,619	1,534	1,478	1,588	1,672	1,725
Biological science	2,417	2,558	2,752	3,158	3,472	3,790	4,157
Agricultural science	140	156	171	199	202	317	342
Social sciences	9,692	10,823	12,622	14,896	16,325	17,866	18,882
Social science	5,926	6,606	7,658	9,057	9,905	10,587	10,879
Psychology	3,766	4,217	4,964	5,839	6,420	7,279	8,003
Non-S&E [2]	44,237	46,865	51,953	56,260	60,964	65,714	68,281
Grand total	60,515	64,330	71,608	78,753	85,486	92,535	96,890
	Black, non-Hispanics						
Total science and engineering	9,700	10,400	11,539	13,056	14,322	15,483	16,401
Engineering	670	656	745	748	813	875	999
Sciences	9,030	9,744	10,794	12,308	13,509	14,608	15,402
Natural sciences	3,273	3,306	3,296	3,692	4,100	4,413	4,707
Physical science [1]	332	358	362	435	466	457	539
Mathematical science	418	378	431	530	521	535	519
Computer science	1,252	1,173	1,026	998	1,164	1,237	1,257
Biological science	1,216	1,336	1,415	1,636	1,856	2,053	2,250
Agricultural science	55	61	62	93	93	131	142
Social sciences	5,757	6,438	7,498	8,616	9,409	10,195	10,695
Social science	3,659	4,082	4,689	5,419	5,890	6,191	6,356
Psychology	2,098	2,356	2,809	3,197	3,519	4,004	4,339
Non-S&E [2]	25,224	26,311	29,232	31,737	33,971	36,727	37,888
Grand total	34,924	36,711	40,771	44,793	48,293	52,210	54,289

See explanatory information and SOURCES at end of table.

Appendix table 3-5. Number of earned bachelor's degrees, by field and by race/ethnicity of female recipients: 1989-1995

Page 4 of 5

Field	1989	1990	1991	1992	1993	1994	1995
	Hispanics						
Total science and engineering	6,009	6,484	7,463	8,661	9,282	10,339	11,159
Engineering	461	476	527	546	606	648	756
Sciences	5,548	6,008	6,936	8,115	8,676	9,691	10,403
Natural sciences	1,985	2,029	2,247	2,395	2,426	2,723	2,923
Physical science [1]	201	211	215	220	238	318	363
Mathematical science	149	164	221	203	197	243	221
Computer science	445	416	477	449	396	416	431
Biological science	1,125	1,164	1,245	1,434	1,508	1,603	1,750
Agricultural science	65	74	89	89	87	143	158
Social sciences	3,563	3,979	4,689	5,720	6,250	6,968	7,480
Social science	2,044	2,261	2,700	3,299	3,591	3,974	4,103
Psychology	1,519	1,718	1,989	2,421	2,659	2,994	3,377
Non-S&E [2]	17,350	18,697	20,783	22,320	24,738	26,484	27,657
Grand total	23,359	25,181	28,246	30,981	34,020	36,823	38,816
	American Indians and Alaskan Natives						
Total science and engineering	569	581	653	776	918	999	1,049
Engineering	36	23	27	31	34	39	45
Sciences	533	558	626	745	884	960	1,004
Natural sciences	161	152	191	185	218	257	297
Physical science [1]	18	21	23	25	32	31	32
Mathematical science	15	22	25	24	28	30	29
Computer science	32	30	31	31	28	19	37
Biological science	76	58	92	88	108	134	157
Agricultural science	20	21	20	17	22	43	42
Social sciences	372	406	435	560	666	703	707
Social science	223	263	269	339	424	422	420
Psychology	149	143	166	221	242	281	287
Non-S&E [2]	1,663	1,857	1,938	2,203	2,255	2,503	2,736
Grand total	2,232	2,438	2,591	2,979	3,173	3,502	3,785

See explanatory information and SOURCES at end of table.

Appendix table 3-5. Number of earned bachelor's degrees, by field and by race/ethnicity of female recipients: 1989-1995

Field	1989	1990	1991	1992	1993	1994	1995
	U.S. citizens and permanent residents, unknown race/ethnicity						
Total science and engineering	3,313	4,571	3,777	3,442	3,637	3,776	4,171
Engineering	107	182	174	121	171	145	189
Sciences	3,206	4,389	3,603	3,321	3,466	3,631	3,982
Natural sciences	903	1,125	956	875	831	963	1,166
Physical science [1]	61	103	92	106	89	114	123
Mathematical science	91	152	136	98	107	99	104
Computer science	438	408	231	169	142	149	161
Biological science	298	417	452	408	389	502	618
Agricultural science	15	45	45	94	104	99	160
Social sciences	2,303	3,264	2,647	2,446	2,635	2,668	2,816
Social science	1,411	1,870	1,564	1,457	1,504	1,525	1,601
Psychology	892	1,394	1,083	989	1,131	1,143	1,215
Non-S&E [2]	9,293	13,146	9,660	8,679	9,169	9,117	9,756
Grand total	12,606	17,717	13,437	12,121	12,806	12,893	13,927
	Nonresident aliens [4]						
Total science and engineering	3,280	3,382	3,741	3,897	4,408	4,467	4,820
Engineering	473	490	470	471	464	548	566
Sciences	2,807	2,892	3,271	3,426	3,944	3,919	4,254
Natural sciences	1,520	1,470	1,561	1,563	1,815	1,719	1,859
Physical science [1]	199	180	197	190	239	246	250
Mathematical science	196	200	204	234	207	198	235
Computer science	618	594	574	555	603	606	627
Biological science	447	436	519	514	648	580	659
Agricultural science	60	60	67	70	118	89	88
Social sciences	1,287	1,422	1,710	1,863	2,129	2,200	2,395
Social science	946	1,057	1,197	1,374	1,519	1,552	1,685
Psychology	341	365	513	489	610	648	710
Non-S&E [2]	6,060	6,263	7,689	7,544	8,911	10,017	11,076
Grand total	9,340	9,645	11,430	11,441	13,319	14,484	15,896

[1] In this table, "Physical science" includes earth, atmospheric, and ocean sciences, as well as physics, astronomy, and chemistry.

[2] Non-S&E refers to non-science and non-engineering.

[3] Racial/ethnic categories are as designated on the survey form. These categories include U.S. citizens and foreign citizens on permanent visas (i.e., resident aliens who have been admitted for permanent residency).

[4] Nonresident aliens include foreign citizens on temporary visas only. No racial/ethnic data are collected for this group.

NOTES: Data on race/ethnicity were collected on broad fields of study only until 1994; therefore, these trend data could not be adjusted to the exact field taxonomies used by NSF.

SOURCE: Tabulations by National Science Foundation/SRS; data from National Center for Education Statistics IPEDS Completions Surveys, 1989-95.

Appendix table 3-6. Percentage distribution of persons 18-24 years of age in total population, total undergraduate enrollment, and the index of representation, by race/ethnicity and sex: 1980, 1990-1994[1]

Race/ethnicity and sex	1980			1990			1991		
	Percent of 18-24 years population	Percent of undergraduate enrollment	Index of representation	Percent of 18-24 years population	Percent of undergraduate enrollment	Index of representation	Percent of 18-24 years population	Percent of undergraduate enrollment	Index of representation
White males	38.90	39.00	100.30	35.72	35.35	98.96	35.49	34.57	97.41
Asian males	0.78	1.25	159.40	1.67	2.12	127.20	1.74	2.30	132.10
Black males	6.19	4.13	66.65	6.65	3.74	56.21	6.72	3.87	57.66
Hispanic males	3.93	2.51	63.80	6.54	3.15	48.19	6.62	3.38	51.10
American Indian males	0.34	0.33	98.79	0.41	0.34	81.42	0.42	0.36	84.21
White females	38.41	42.62	110.94	34.69	42.99	123.93	34.41	42.36	123.07
Asian females	0.77	1.17	152.11	1.57	2.04	129.95	1.66	2.27	136.70
Black females	6.67	5.70	85.44	6.90	5.82	84.35	6.94	6.09	87.69
Hispanic females	3.65	2.84	77.59	5.46	3.98	72.96	5.58	4.30	76.97
American Indian females	0.33	0.42	126.31	0.40	0.47	119.09	0.40	0.50	124.16

Race/ethnicity and sex	1992			1993			1994		
	Percent of 18-24 years population	Percent of undergraduate enrollment	Index of representation	Percent of 18-24 years population	Percent of undergraduate enrollment	Index of representation	Percent of 18-24 years population	Percent of undergraduate enrollment	Index of representation
White males	35.21	33.74	95.83	35.03	33.30	95.07	34.80	32.59	93.64
Asian males	1.84	2.48	134.67	1.92	2.61	135.60	1.98	2.76	139.36
Black males	6.79	3.99	58.77	6.83	4.10	59.96	6.91	4.14	59.99
Hispanic males	6.68	3.65	54.59	6.70	3.82	57.05	6.75	4.04	59.90
American Indian males	0.44	0.37	85.98	0.44	0.39	87.79	0.45	0.40	90.03
White females	34.12	41.76	122.37	33.90	41.21	121.58	33.62	40.73	121.14
Asian females	1.78	2.51	141.15	1.87	2.66	142.33	1.95	2.86	146.54
Black females	7.00	6.33	90.31	7.03	6.49	92.26	7.11	6.72	94.52
Hispanic females	5.72	4.66	81.39	5.85	4.89	83.57	6.00	5.19	86.43
American Indian females	0.42	0.52	124.22	0.42	0.54	126.20	0.43	0.57	131.52

[1]The numbers of cases for the percent distributions are presented in appendix table 3-7. Nonresident aliens were not included in these calculations. The numbers displayed may not be exact due to rounding error.

SOURCES: U.S. Department of Education/NCES Opening Fall Enrollment Survey and U.S. Bureau of the Census, Current Population Reports, tabulations by National Science Foundation/SRS.

Appendix table 3-7. Number of persons 18-24 years of age in total population and total undergraduate enrollment, by race/ethnicity and sex: 1980, 1990-1994[1]

Race/ethnicity and sex	1980 18-24 years population	1980 Undergraduate enrollment	1990 18-24 years population	1990 Undergraduate enrollment	1991 18-24 years population	1991 Undergraduate enrollment
Total	30,103,000	10,392,825	26,831,000	11,784,320	26,384,000	12,360,130
White males	11,715,000	4,057,626	9,585,000	4,165,862	9,364,000	4,273,310
Asian males	236,000	129,876	448,000	250,287	460,000	284,673
Black males	1,864,000	428,913	1,783,000	440,209	1,772,000	478,648
Hispanic males	1,184,000	260,800	1,754,000	371,232	1,747,000	418,243
American Indian males	102,000	34,790	111,000	39,692	112,000	44,186
White females	11,564,000	4,429,148	9,308,000	5,066,228	9,080,000	5,235,217
Asian females	232,000	121,837	422,000	240,847	438,000	280,493
Black females	2,007,000	592,008	1,850,000	685,382	1,832,000	752,604
Hispanic females	1,100,000	294,657	1,464,000	469,138	1,473,000	531,103
American Indian females	99,000	43,170	106,000	55,443	106,000	61,653

Race/ethnicity and sex	1992 18-24 years population	1992 Undergraduate enrollment	1993 18-24 years population	1993 Undergraduate enrollment	1994 18-24 years population	1994 Undergraduate enrollment
Total	25,942,000	12,435,117	25,653,000	12,213,674	25,260,000	12,146,792
White males	9,134,000	4,195,726	8,986,000	4,067,289	8,791,000	3,958,270
Asian males	478,000	308,564	493,000	318,289	501,000	335,737
Black males	1,761,000	496,123	1,752,000	500,194	1,745,000	503,381
Hispanic males	1,733,000	453,488	1,720,000	467,155	1,704,000	490,827
American Indian males	113,000	46,572	113,000	47,233	113,000	48,920
White females	8,852,000	5,192,500	8,696,000	5,033,796	8,493,000	4,947,344
Asian females	461,000	311,899	479,000	324,604	493,000	347,394
Black females	1,817,000	786,609	1,804,000	792,427	1,795,000	815,881
Hispanic females	1,485,000	579,329	1,501,000	597,193	1,516,000	630,102
American Indian females	108,000	64,307	109,000	65,494	109,000	68,936

[1]Distributions of U.S. Bureau of the Census' estimate of the 18-24 years of age population of the United States are presented in appendix table 3-8.

SOURCES: U.S. Department of Education/NCES Opening Fall Enrollment Survey and U.S. Bureau of the Census, Current Population Reports, tabulations by National Science Foundation/SRS.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 3-8. U.S. population estimates of persons 18-24, by race/ethnicity, sex, and age: 1980, 1990-1994
[Numbers in thousands]

Page 1 of 1

Race/ethnicity and sex	1980			1990			1991		
	Total	18-19	20-24	Total	18-19	20-24	Total	18-19	20-24
Total	30,103	8,718	21,385	26,831	7,699	19,132	26,384	6,950	19,434
White males	11,715	3,379	8,336	9,585	2,741	6,844	9,364	2,533	6,831
Asian males	236	66	170	448	128	320	460	123	337
Black males	1,864	578	1,286	1,783	554	1,229	1,772	532	1,240
Hispanic males	1,184	344	840	1,754	479	1,275	1,747	459	1,288
American Indian males	102	32	70	111	34	77	112	33	79
White females	11,564	3,311	8,253	9,308	2,645	6,663	9,080	2,428	6,652
Asian females	232	61	171	422	121	301	438	118	320
Black females	2,007	598	1,409	1,850	555	1,295	1,832	530	1,302
Hispanic females	1,100	319	781	1,464	410	1,054	1,473	163	1,310
American Indian females	99	30	69	106	32	74	106	31	75

Race/ethnicity and sex	1992			1993			1994		
	Total	18-19	20-24	Total	18-19	20-24	Total	18-19	20-24
Total	25,942	6,868	19,074	25,653	6,868	18,785	25,260	6,907	18,353
White males	9,134	2,395	6,739	8,986	2,402	6,584	8,791	2,410	6,381
Asian males	478	123	355	493	128	365	501	131	370
Black males	1,761	508	1,253	1,752	502	1,250	1,745	503	1,242
Hispanic males	1,733	445	1,288	1,720	439	1,281	1,704	447	1,257
American Indian males	113	31	82	113	31	82	113	31	82
White females	8,852	2,301	6,551	8,696	2,299	6,397	8,493	2,302	6,191
Asian females	461	119	342	479	122	357	493	126	367
Black females	1,817	509	1,308	1,804	502	1,302	1,795	503	1,292
Hispanic females	1,485	406	1,079	1,501	412	1,089	1,516	423	1,093
American Indian females	108	31	77	109	31	78	109	31	78

SOURCES: U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 601, Projections of the Population of the United States: 2050, U.S. Government Printing Office, Washington, D.C., 1975. U.S. Bureau of the Census, Current Population Reports, P25-1095, U.S. Population Estimates, by 1975 to Age, Sex, Race, and Hispanic Origin: 1980 to 1991. U.S. Government Printing Office, Washington, D.C., 1993. U.S. Bureau of the Census, Current Population Reports, P25-1092, Population Projections of the United States, by Age, Sex, Race, and Hispanic Origin: 1992 to 2050, U.S. Government Printing Office, Washington, D.C., 1992.

Appendix table 3-9. Total undergraduate enrollment at all institutions, by sex and race/ethnicity: Fall 1976-1994, selected years

Page 1 of 2

Enrollment status, sex, and race/ethnicity	1976	1980	1990	1991	1992	1993	1994
Total undergraduate enrollment:							
Total, all races and ethnicities	9,536,927	10,603,579	12,011,657	12,595,335	12,693,778	12,482,813	12,417,701
Non-resident aliens	144,535	210,753	227,337	235,205	258,661	269,139	270,909
White, non-Hispanic	7,759,913	8,486,774	9,232,090	9,508,527	9,388,226	9,101,085	8,905,614
Asian or Pacific Islander	172,633	251,713	491,134	565,166	620,463	642,893	683,131
Underrepresented minorities	1,459,846	1,654,339	2,061,096	2,286,437	2,426,428	2,469,696	2,558,047
Black, non-Hispanic	946,476	1,020,921	1,125,591	1,231,252	1,282,732	1,292,621	1,319,262
American Indian or Alaskan Native	69,955	77,961	95,135	105,839	110,879	112,727	117,856
Hispanic	443,415	555,457	840,370	949,346	1,032,817	1,064,348	1,120,929
Men, all races and ethnicities	4,951,997	5,052,234	5,396,557	5,632,690	5,644,113	5,547,126	5,484,342
Non-resident aliens	97,198	140,229	129,275	133,630	143,640	146,966	147,207
White, non-Hispanic	4,063,605	4,057,626	4,165,862	4,273,310	4,195,726	4,067,289	3,958,270
Asian or Pacific Islander	92,787	129,876	250,287	284,673	308,564	318,289	335,737
Underrepresented minorities	698,407	724,503	851,133	941,077	996,183	1,014,582	1,043,128
Black, non-Hispanic	432,042	428,913	440,209	478,648	496,123	500,194	503,381
American Indian or Alaskan Native	34,894	34,790	39,692	44,186	46,572	47,233	48,920
Hispanic	231,472	260,800	371,232	418,243	453,488	467,155	490,827
Women, all races and ethnicities	4,584,930	5,551,345	6,615,100	6,962,645	7,049,665	6,935,687	6,933,359
Non-resident aliens	47,338	70,525	98,062	101,575	115,021	122,173	123,702
White, non-Hispanic	3,696,308	4,429,148	5,066,228	5,235,217	5,192,500	5,033,796	4,947,344
Asian or Pacific Islander	79,846	121,837	240,847	280,493	311,899	324,604	347,394
Underrepresented minorities	761,439	929,835	1,209,963	1,345,360	1,430,245	1,455,114	1,514,919
Black, non-Hispanic	514,434	592,008	685,382	752,604	786,609	792,427	815,881
American Indian or Alaskan Native	35,062	43,170	55,443	61,653	64,307	65,494	68,936
Hispanic	211,943	294,657	469,138	531,103	579,329	597,193	630,102
Percentage distibution:							
Total, all races and ethnicities	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Non-resident aliens	1.5%	2.0%	1.9%	1.9%	2.0%	2.2%	2.2%
White, non-Hispanic	81.4%	80.0%	76.9%	75.5%	74.0%	72.9%	71.7%
Asian or Pacific Islander	1.8%	2.4%	4.1%	4.5%	4.9%	5.2%	5.5%
Underrepresented minorities	15.3%	15.6%	17.2%	18.2%	19.1%	19.8%	20.6%
Black, non-Hispanic	9.9%	9.6%	9.4%	9.8%	10.1%	10.4%	10.6%
American Indian or Alaskan Native	0.7%	0.7%	0.8%	0.8%	0.9%	0.9%	0.9%
Hispanic	4.6%	5.2%	7.0%	7.5%	8.1%	8.5%	9.0%
Men, all races and ethnicities	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Non-resident aliens	2.0%	2.8%	2.4%	2.4%	2.5%	2.6%	2.7%
White, non-Hispanic	82.1%	80.3%	77.2%	75.9%	74.3%	73.3%	72.2%
Asian or Pacific Islander	1.9%	2.6%	4.6%	5.1%	5.5%	5.7%	6.1%
Underrepresented minorities	14.1%	14.3%	15.8%	16.7%	17.6%	18.3%	19.0%
Black, non-Hispanic	8.7%	8.5%	8.2%	8.5%	8.8%	9.0%	9.2%
American Indian or Alaskan Native	0.7%	0.7%	0.7%	0.8%	0.8%	0.9%	0.9%
Hispanic	4.7%	5.2%	6.9%	7.4%	8.0%	8.4%	8.9%

See explanatory information and SOURCES at end of table.

Appendix table 3-9. Total undergraduate enrollment at all institutions, by sex and race/ethnicity: Fall 1976-1994, selected years

Page 2 of 2

Enrollment status, sex, and race/ethnicity	1976	1980	1990	1991	1992	1993	1994
Women, all races and ethnicities	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Non-resident aliens	1.0%	1.3%	1.5%	1.5%	1.6%	1.8%	1.8%
White, non-Hispanic	80.6%	79.8%	76.6%	75.2%	73.7%	72.6%	71.4%
Asian or Pacific Islander	1.7%	2.2%	3.6%	4.0%	4.4%	4.7%	5.0%
Underrepresented minorities	16.6%	16.7%	18.3%	19.3%	20.3%	21.0%	21.8%
Black, non-Hispanic	11.2%	10.7%	10.4%	10.8%	11.2%	11.4%	11.8%
American Indian or Alaskan Native	0.8%	0.8%	0.8%	0.9%	0.9%	0.9%	1.0%
Hispanic	4.6%	5.3%	7.1%	7.6%	8.2%	8.6%	9.1%

NOTE: Other/unknown races and ethnicities have been distributed proportionately across groups. Because of rounding, details may not sum to totals.

SOURCES: U.S. Department of Education/NCES. Opening Fall Enrollment Survey; tabulations by National Science Foundation/SRS.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 3-10. Proportion of 4-year college dominant students participating in key core science and mathematics courses, by race/ethnicity and sex: 1982-1993 cohort

	White	Black	Hispanic	Asian	Women	Men
General pre-college mathematics	6.3%	17.6%	8.0%	-	7.9%	6.7%
Pre-college algebra	11.8	18.7	21.4	-	13.4	12.0
Pre-college algebra	26.1	26.1	21.5	16.5	24.9	26.7
Pre-calculus	21.7	22.1	15.5	48.7	17.9	26.5
Finite/discrete mathematics	9.7	6.2	4.8	13.9	8.5	10.1
Statistics	26.9	20.5	20.9	28.5	24.7	27.4
Calculus	32.2	18.5	26.3	63.3	23	40.3
Introductory computer science	20.8	13	12.5	14.2	17.3	21.9
Computer programming	21.9	18.2	21.6	33.7	16.7	27.1
Computer organization and architecture	4.4	5.2	7.2	5.8	3	6.3
Data processing	7.1	7.1	8.1	0	6.8	7.3
Systems organization and analysis	6	5.3	5.7	10.5	4.3	7.7
General biology	32.3	41.4	29	35.7	38.6	27.1
Microbiology	7	6.2	5.3	9.7	9.9	3.7
Ecology	6.6	3.7	8.2	9	7	5.8
Genetics	6.1	4.2	-	12.9	5.8	6.2
Anatomy and physiology	10.1	8.9	15.1	8.5	14.4	5.6
Physiology	7.6	8.3	5.5	14.3	10.1	5.1
Biochemistry	4.8	3.8	4.5	15.9	5.5	4.4
General physical science	6.8	17.1	5.9	-	8.1	7.3
Astronomy	13.4	6.6	13.3	10.8	10	15.5
General geology	1.4	6.1	6.9	-	8.9	12.4
General chemistry	34.3	22.2	30.5	59.5	29.9	37.5
Organic chemistry	9.5	7.3	5.6	24.8	9.6	9.6
Introductory physics	22.7	15.7	16.1	48.5	15.1	30.3

NOTE: Universe: Students who earned 30 or more credits from 4-year colleges and 10 or fewer credits from 2-year colleges. Weighted N=969,228. - = Too few observations in the sample to produce a reliable estimate.

SOURCE: National Center for Education Statistics High School and Beyond/Sophomore Cohort, 1982-1993 Cohort.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 3-11. Proportion of community college dominant students participating in key core science, mathematics, and technology courses, by gender: 1982-1993 cohort

Page 1 of 1

	Women	Men
General pre-college mathematics	13.6%	9.6%
Arithmetic, pre-algebra	6.4	6.8
Pre-college algebra	26.4	30.7
College algebra	13.5	20.1
Pre-calculus	4.6	8.3
Technical mathematics	6	19.4
Business mathematics: pre-college	18.1	12.4
Introductory computer science	10.4	18.1
Computer programming	13.8	16.9
Data processing	20.1	12.5
Electronics technology	-	17.7
Computer technology	-	10.9
General biology	15.8	13.9
Microbiology	11.1	-
Anatomy and physiology	20.3	2.6
Human development	6.9	-
Astronomy	4.6	5
General chemistry	10.8	11.2
Introductory physics	-	10.2

NOTE: Universe: Students who earned 30 or more credits from 4-year colleges and 10 or fewer credits from 2-year colleges. - = Too few observations in the sample to produce a reliable estimate.

SOURCE: National Center for Education Statistics, High School and Beyond/Sophomore Cohort, 1982-1993 Cohort

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 3-12. Total enrollment at 2-year institutions, by sex and race/ethnicity: Fall 1976-1994, selected years

Page 1 of 2

Enrollment status, sex, and race/ethnicity	1976	1980	1990	1991	1992	1993	1994
Total enrollment							
Total, all races and ethnicities	3,719,873	4,381,779	5,126,629	5,572,644	5,641,541	5,479,815	5,422,242
Non-resident aliens	40,440	62,363	74,831	73,665	90,557	91,595	92,092
White, non-Hispanic	2,945,192	3,439,968	3,862,573	4,125,453	4,057,223	3,879,659	3,760,725
Asian or Pacific Islander	78,038	123,876	215,506	258,244	292,505	298,636	316,094
Underrepresented minorities	656,202	755,572	973,719	1,115,282	1,201,256	1,209,925	1,253,331
Black, non-Hispanic	407,375	452,325	501,766	566,040	589,641	585,835	600,743
American Indian or Alaskan Native	38,606	44,759	51,677	59,230	60,339	60,476	62,188
Hispanic	210,221	258,488	420,276	490,012	551,276	563,614	590,400
Men, all races and ethnicities	1,897,687	1,985,211	2,187,395	2,371,462	2,380,155	2,312,351	2,279,995
Non-resident aliens	24,788	38,529	37,058	38,135	45,657	45,191	45,319
White, non-Hispanic	1,507,456	1,549,876	1,642,810	1,750,720	1,705,468	1,631,398	1,577,034
Asian or Pacific Islander	42,006	62,939	108,274	128,816	143,283	145,879	153,680
Underrepresented minorities	323,437	333,867	399,253	453,791	485,747	489,883	503,962
Black, non-Hispanic	190,816	190,199	191,072	213,086	218,216	217,273	220,630
American Indian or Alaskan Native	19,177	19,652	21,236	24,410	24,768	24,850	25,144
Hispanic	113,443	124,016	186,945	216,295	242,763	247,760	258,188
Women, all races and ethnicities	1,822,186	2,396,568	2,939,234	3,201,182	3,261,386	3,167,464	3,142,247
Non-resident aliens	15,652	23,834	37,773	35,530	44,900	46,404	46,773
White, non-Hispanic	1,437,736	1,890,093	2,219,763	2,374,733	2,351,755	2,248,261	2,183,691
Asian or Pacific Islander	36,032	60,937	107,232	129,428	149,222	152,757	162,414
Underrepresented minorities	332,766	421,704	574,466	661,491	715,509	720,042	749,369
Black, non-Hispanic	216,559	262,126	310,694	352,954	371,425	368,562	380,113
American Indian or Alaskan Native	19,429	25,106	30,441	34,820	35,571	35,626	37,044
Hispanic	96,778	134,472	233,331	273,717	308,513	315,854	332,212
Percentage distribution							
Total, all races and ethnicities	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Non-resident aliens	1.1%	1.4%	1.5%	1.3%	1.6%	1.7%	1.7%
White, non-Hispanic	79.2%	78.5%	75.3%	74.0%	71.9%	70.8%	69.4%
Asian or Pacific Islander	2.1%	2.8%	4.2%	4.6%	5.2%	5.4%	5.8%
Underrepresented minorities	17.6%	17.2%	19.0%	20.0%	21.3%	22.1%	23.1%
Black, non-Hispanic	11.0%	10.3%	9.8%	10.2%	10.5%	10.7%	11.1%
American Indian or Alaskan Native	1.0%	1.0%	1.0%	1.1%	1.1%	1.1%	1.1%
Hispanic	5.7%	5.9%	8.2%	8.8%	9.8%	10.3%	10.9%
Men, all races and ethnicities	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Non-resident aliens	1.3%	1.9%	1.7%	1.6%	1.9%	2.0%	2.0%
White, non-Hispanic	79.4%	78.1%	75.1%	73.8%	71.7%	70.6%	69.2%
Asian or Pacific Islander	2.2%	3.2%	4.9%	5.4%	6.0%	6.3%	6.7%
Underrepresented minorities	17.0%	16.8%	18.3%	19.1%	20.4%	21.2%	22.1%
Black, non-Hispanic	10.1%	9.6%	8.7%	9.0%	9.2%	9.4%	9.7%
American Indian or Alaskan Native	1.0%	1.0%	1.0%	1.0%	1.0%	1.1%	1.1%
Hispanic	6.0%	6.2%	8.5%	9.1%	10.2%	10.7%	11.3%

See expanatory information and SOURCES at end of table.

Appendix table 3-12. Total enrollment at 2-year institutions, by sex and race/ethnicity: Fall 1976-1994, selected years

Page 2 of 2

Enrollment status, sex, and race/ethnicity	1976	1980	1990	1991	1992	1993	1994
Women, all races and ethnicities	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Non-resident aliens	0.9%	1.0%	1.3%	1.1%	1.4%	1.5%	1.5%
White, non-Hispanic	78.9%	78.9%	75.5%	74.2%	72.1%	71.0%	69.5%
Asian or Pacific Islander	2.0%	2.5%	3.6%	4.0%	4.6%	4.8%	5.2%
Underrepresented minorities	18.3%	17.6%	19.5%	20.7%	21.9%	22.7%	23.8%
Black, non-Hispanic	11.9%	10.9%	10.6%	11.0%	11.4%	11.6%	12.1%
American Indian or Alaskan Native	1.1%	1.0%	1.0%	1.1%	1.1%	1.1%	1.2%
Hispanic	5.3%	5.6%	7.9%	8.6%	9.5%	10.0%	10.6%

NOTE: Other/unknown races and ethnicities have been distributed proportionately across groups. Because of rounding, details may not sum to totals.

SOURCES: U.S. Department of Education/NCES. Opening Fall Enrollment Survey; tabulations by National Science Foundation/SRS.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 3-13. Full-time enrollment at 2-year institutions, by sex and race/ethnicity: Fall 1976-1994, selected years

Enrollment status, sex, and race/ethnicity	1976	1980	1990	1991	1992	1993	1994
Full-time enrollment:							
Total, all races and ethnicities	1,578,879	1,673,285	1,854,914	2,051,499	2,052,345	2,018,843	2,003,156
Non-resident aliens	23,455	38,130	39,170	39,622	45,552	48,065	49,780
White, non-Hispanic	1,203,160	1,256,837	1,365,469	1,479,114	1,449,485	1,399,190	1,355,666
Asian or Pacific Islander	32,907	45,678	75,777	92,123	102,247	108,109	116,879
Underrepresented minorities	319,358	332,640	374,498	440,640	455,061	463,479	480,831
Black, non-Hispanic	208,009	213,043	201,362	233,333	232,604	233,932	239,240
American Indian or Alaskan Native	17,330	17,040	19,987	24,165	24,987	25,337	26,239
Hispanic	94,018	102,557	153,149	183,142	197,470	204,210	215,352
Men, all races and ethnicities	860,049	842,831	869,326	952,894	939,615	919,688	901,363
Non-resident aliens	15,919	26,360	20,476	21,372	23,747	24,417	25,524
White, non-Hispanic	665,656	641,136	650,420	699,036	674,998	649,203	622,180
Asian or Pacific Islander	19,029	25,092	40,625	48,455	52,714	55,237	59,568
Underrepresented minorities	159,446	150,243	157,805	184,031	188,156	190,831	194,091
Black, non-Hispanic	98,356	92,731	81,692	93,523	90,536	90,959	90,322
American Indian or Alaskan Native	8,984	7,994	8,800	10,475	10,725	10,964	11,020
Hispanic	52,106	49,519	67,313	80,033	86,895	88,908	92,749
Women, all races and ethnicities	718,830	830,454	985,588	1,098,605	1,112,730	1,099,155	1,101,793
Non-resident aliens	7,536	11,770	18,694	18,250	21,805	23,648	24,256
White, non-Hispanic	537,504	615,701	715,049	780,078	774,487	749,987	733,486
Asian or Pacific Islander	13,878	20,586	35,152	43,668	49,533	52,872	57,311
Underrepresented minorities	159,912	182,397	216,693	256,609	266,905	272,648	286,740
Black, non-Hispanic	109,653	120,313	119,670	139,810	142,068	142,973	148,918
American Indian or Alaskan Native	8,346	9,046	11,187	13,690	14,262	14,373	15,219
Hispanic	41,912	53,038	85,836	103,109	110,575	115,302	122,603
Percentage distribution:							
Total, all races and ethnicities	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Non-resident aliens	1.5%	2.3%	2.1%	1.9%	2.2%	2.4%	2.5%
White, non-Hispanic	76.2%	75.1%	73.6%	72.1%	70.6%	69.3%	67.7%
Asian or Pacific Islander	2.1%	2.7%	4.1%	4.5%	5.0%	5.4%	5.8%
Underrepresented minorities	20.2%	19.9%	20.2%	21.5%	22.2%	23.0%	24.0%
Black, non-Hispanic	13.2%	12.7%	10.9%	11.4%	11.3%	11.6%	11.9%
American Indian or Alaskan Native	1.1%	1.0%	1.1%	1.2%	1.2%	1.3%	1.3%
Hispanic	6.0%	6.1%	8.3%	8.9%	9.6%	10.1%	10.8%
Men, all races and ethnicities	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Non-resident aliens	1.9%	3.1%	2.4%	2.2%	2.5%	2.7%	2.8%
White, non-Hispanic	77.4%	76.1%	74.8%	73.4%	71.8%	70.6%	69.0%
Asian or Pacific Islander	2.2%	3.0%	4.7%	5.1%	5.6%	6.0%	6.6%
Underrepresented minorities	18.5%	17.8%	18.2%	19.3%	20.0%	20.7%	21.5%
Black, non-Hispanic	11.4%	11.0%	9.4%	9.8%	9.6%	9.9%	10.0%
American Indian or Alaskan Native	1.0%	0.9%	1.0%	1.1%	1.1%	1.2%	1.2%
Hispanic	6.1%	5.9%	7.7%	8.4%	9.2%	9.7%	10.3%

See explanatory information and SOURCES at end of table.

Appendix table 3-13. Full-time enrollment at 2-year institutions, by sex and race/ethnicity: Fall 1976-1994, selected years

Page 2 of 2

Enrollment status, sex, and race/ethnicity	1976	1980	1990	1991	1992	1993	1994
Women, all races and ethnicities	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Non-resident aliens	1.0%	1.4%	1.9%	1.7%	2.0%	2.2%	2.2%
White, non-Hispanic	74.8%	74.1%	72.6%	71.0%	69.6%	68.2%	66.6%
Asian or Pacific Islander	1.9%	2.5%	3.6%	4.0%	4.5%	4.8%	5.2%
Underrepresented minorities	22.2%	22.0%	22.0%	23.4%	24.0%	24.8%	26.0%
Black, non-Hispanic	15.3%	14.5%	12.1%	12.7%	12.8%	13.0%	13.5%
American Indian or Alaskan Native	1.2%	1.1%	1.1%	1.2%	1.3%	1.3%	1.4%
Hispanic	5.8%	6.4%	8.7%	9.4%	9.9%	10.5%	11.1%

NOTE: Other/unknown races and ethnicities have been distributed proportionately across groups. Because of rounding, details may not sum to totals.

SOURCES: U.S. Department of Education/NCES. Opening Fall Enrollment Survey, tabulations by National Science Foundation/SRS

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 3-14. Percentage distribution of persons 18-24 years of age in total population, total student enrollment in 2-year institutions, and the index of representation, by race/ethnicity and sex: 1980, 1990-1994[1]

Page 1 of 1

Race/ethnicity and sex	1980			1990			1991		
	Percent of 18-24 years population	Percent of 2-year college enrollment	Index of represention	Percent of 18-24 years population	Percent of 2-year college enrollment	Index of represention	Percent of 18-24 years population	Percent of 2-year college enrollment	Index of represention
White males	38.92	35.88	92.20	35.72	32.52	91.03	35.49	31.84	89.70
Asian males	0.78	1.46	185.86	1.67	2.14	128.36	1.74	2.34	134.36
Black males	6.19	4.40	71.11	6.65	3.78	56.92	6.72	3.88	57.70
Hispanic males	3.93	2.87	73.00	6.54	3.70	56.61	6.62	3.93	59.40
American Indian males	0.34	0.45	134.27	0.41	0.42	101.61	0.42	0.44	104.57
White females	38.41	43.76	113.91	34.69	43.94	126.66	34.41	43.18	125.48
Asian females	0.77	1.41	183.05	1.57	2.12	134.96	1.66	2.35	141.78
Black females	6.67	6.07	91.02	6.90	6.15	89.20	6.94	6.42	92.44
Hispanic females	3.65	3.11	85.20	5.46	4.62	84.65	5.58	4.98	89.16
American Indian females	0.33	0.58	176.74	0.40	0.60	152.53	0.40	0.63	157.61

Race/ethnicity and sex	1992			1993			1994		
	Percent of 18-24 years population	Percent of 2-year college enrollment	Index of represention	Percent of 18-24 years population	Percent of 2-year college enrollment	Index of represention	Percent of 18-24 years population	Percent of 2-year college enrollment	Index of represention
White males	35.21	30.72	87.26	35.03	30.28	86.43	34.80	29.59	85.02
Asian males	1.84	2.58	140.09	1.92	2.71	140.88	1.98	2.88	145.37
Black males	6.79	3.93	57.91	6.83	4.03	59.04	6.91	4.14	59.92
Hispanic males	6.66	4.37	65.47	6.70	4.60	68.58	6.75	4.84	71.81
American Indian males	0.44	0.45	102.43	0.44	0.46	104.70	0.45	0.47	105.45
White females	34.12	42.37	124.16	33.90	41.73	123.09	33.62	40.97	121.85
Asian females	1.78	2.69	151.27	1.87	2.84	151.83	1.95	3.05	156.12
Black females	7.00	6.69	95.53	7.03	6.84	97.27	7.11	7.13	100.36
Hispanic females	5.72	5.56	97.09	5.85	5.86	100.18	6.00	6.23	103.85
American Indian females	0.42	0.64	153.92	0.42	0.66	155.61	0.43	0.69	161.06

[1]The number of cases for the percent distributions are presented in appendix table 3-15. Nonresident aliens were not included in these calculations. The numbers displayed may not be exact due to rounding error.

SOURCES: U.S. Department of Education/NCES Opening Fall Enrollment Survey and U.S. Bureau of the Census, Current Population Reports, tabulations by National Science Foundation/SRS.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 3-15. Number of persons 18-24 years of age in total population and total 2-year college enrollment, by race/ethnicity[1] and sex: 1980, 1990-1994

Page 1 of 1

Race/ethnicity and sex	1980 18-24 years population	1980 Total 2-year college enrollment	1990 18-24 years population	1990 Total 2-year college enrollment	1991 18-24 years population	1991 Total 2-year college enrollment
Total	30,103,000	4,319,416	26,831,000	5,051,798	26,384,000	5,498,979
White males	11,715,000	1,549,876	9,585,000	1,642,810	9,364,000	1,750,720
Asian males	236,000	62,939	448,000	108,274	460,000	128,816
Black males	1,864,000	190,199	1,783,000	191,072	1,772,000	213,086
Hispanic males	1,184,000	124,016	1,754,000	186,945	1,747,000	216,295
American Indian males	102,000	19,652	111,000	21,236	112,000	24,410
White females	11,564,000	1,890,093	9,308,000	2,219,763	9,080,000	2,374,733
Asian females	232,000	60,937	422,000	107,232	438,000	129,428
Black females	2,007,000	262,126	1,850,000	310,694	1,832,000	352,954
Hispanic females	1,100,000	134,472	1,464,000	233,331	1,473,000	273,717
American Indian females	99,000	25,106	106,000	30,441	106,000	34,820

Race/ethnicity and sex	1992 18-24 years population	1992 Total 2-year college enrollment	1993 18-24 years population	1993 Total 2-year college enrollment	1994 18-24 years population	1994 Total 2-year college enrollment
Total	25,942,000	5,550,984	25,653,000	5,388,220	25,260,000	5,330,150
White males	9,134,000	1,705,468	8,986,000	1,631,398	8,791,000	1,577,034
Asian males	478,000	143,283	493,000	145,879	501,000	153,680
Black males	1,761,000	218,216	1,752,000	217,273	1,745,000	220,630
Hispanic males	1,733,000	242,763	1,720,000	247,760	1,704,000	258,188
American Indian males	113,000	24,768	113,000	24,850	113,000	25,144
White females	8,852,000	2,351,755	8,696,000	2,248,261	8,493,000	2,183,691
Asian females	461,000	149,222	479,000	152,757	493,000	162,414
Black females	1,817,000	371,425	1,804,000	368,562	1,795,000	380,113
Hispanic females	1,485,000	308,513	1,501,000	315,854	1,516,000	332,212
American Indian females	108,000	35,571	109,000	35,626	109,000	37,044

[1]Nonresident aliens were not included in these calculations. The numbers displayed may not be exact due to rounding error.

SOURCES: U.S. Department of Education/NCES Opening Fall Enrollment Survey and U.S. Bureau of the Census, Current Population Reports, tabulations by National Science Foundation/SRS.

Appendix table 3-16. Percentage of undergraduates who reported a disability and among those with disabilities, the type of disability: 1995-1996

Page 1 of 3

	Any disabilities	Type of disability reported among those reporting a disability					
		Visual	Hearing	Speech	Orthopedic	Learning disability	Other
Total	5.5	16.3	16.3	3.0	22.9	29.2	21.2
Age as of 12/31/95							
18 years or younger	4.5	18.7	11.4	4.2	6.1	40.7	22.0
19-23 years	4.7	15.4	16.1	3.8	9.6	42.9	19.4
24-29 years	4.2	14.5	19.6	4.5	20.8	28.5	22.9
30-39 years	6.5	19.2	14.7	1.3	33.1	19.8	19.9
40 years or older	10.3	16.1	17.7	1.6	44.3	10.1	23.9
Single parent							
No	5.4	17.0	16.4	3.1	23.5	30.0	18.7
Yes	6.4	11.6	15.2	2.5	18.3	23.6	40.1
Number of dependents							
None	5.1	18.0	15.7	2.8	19.9	32.8	18.9
One or more	6.8	12.4	17.6	3.5	29.9	20.8	26.5
Average hours worked while enrolled							
Did not work	9.2	11.7	13.6	1.9	35.0	22.2	29.5
1-15 hours	4.8	17.4	10.9	2.8	17.8	37.9	20.8
16-20 hours	3.6	10.7	21.0	5.3	10.1	56.6	7.6
21-34 hours	5.8	15.5	18.7	6.8	12.2	36.7	16.3
35 or more hours	4.1	25.1	17.7	1.4	21.0	20.8	18.0
Level of institution							
Less-than-2-year	8.8	18.4	19.4	0.6	34.4	20.2	20.3
2-year	5.9	17.1	16.3	2.3	24.7	28.9	21.1
4-year	4.7	16.0	15.3	4.6	19.2	29.7	20.7
Institution type							
Public	5.3	17.0	17.3	3.2	22.5	27.6	21.0
Less-than-2-year	7.4	28.0	18.9	0.0	13.4	30.5	13.0
2-year	5.9	17.2	16.9	2.3	24.0	29.1	21.1
4-year non-doctorate-granting	5.6	13.0	20.2	5.2	28.4	22.4	17.8
Doctorate-granting	3.5	18.9	15.4	4.9	11.5	26.7	25.7
Private not-for-profit	5.6	17.6	11.1	3.7	19.2	36.0	18.9
Less-than-4-year	8.0	24.2	16.4	2.2	33.3	12.9	20.2
4-year non-doctorate-granting	5.9	17.6	7.1	3.2	14.3	42.4	20.6
Doctorate-granting	4.3	14.1	19.5	5.6	25.5	29.9	13.8
Private for-profit	7.3	13.1	15.5	0.6	38.7	23.1	23.5
More than one institution	6.8	10.6	18.7	1.6	19.2	37.5	25.2
Class level							
First-year beginning	5.9	15.2	12.4	3.7	17.2	38.1	21.4
Other first year	6.6	20.9	16.3	2.7	27.7	22.1	20.1
Second year	4.6	9.8	18.4	3.4	20.6	31.3	21.3
Third year	5.1	17.9	18.0	3.6	26.0	36.7	13.9
Fourth or fifth year	4.4	18.0	17.8	2.4	19.7	22.6	23.3
Unclassified	5.5	7.7	20.4	0.0	24.6	27.3	37.8
Attendance intensity							
Exclusively full-time	5.7	15.1	15.5	2.3	23.2	32.0	19.4
Mixed full-time and part-time	4.6	17.3	16.4	2.6	19.7	29.9	25.7
Exclusively part-time	5.5	17.9	18.6	4.4	24.5	24.6	19.8

See explanatory information and SOURCES at end of table.

Appendix table 3-16. Percentage of undergraduates who reported a disability and among those with disabilities, the type of disability: 1995-1996

Page 2 of 3

	Any disabilities	Type of disability reported among those reporting a disability					
		Visual	Hearing	Speech	Orthopedic	Learning disability	Other
Total	5.5	16.3	16.3	3.0	22.9	29.2	21.2
Attendance status							
Full-time, full year	5.3	17.5	14.7	2.5	17.7	33.9	22.1
Full-time, part year	6.9	10.1	15.0	1.3	34.4	25.7	18.9
Part-time, full year	5.5	19.4	22.5	3.1	17.5	28.5	21.7
Part-time, part year	5.3	15.6	13.2	5.0	30.2	23.5	20.8
Undergraduate program							
Certificate	7.2	25.5	18.6	1.3	30.5	19.9	13.5
Associate's degree	6.1	11.8	16.5	3.6	23.5	32.8	23.3
Bachelor's degree	4.6	15.8	15.3	3.2	19.3	30.0	21.9
Nondegree program	3.8	low n	low n	low n	low n	low n	low n
Gender							
Male	6.3	14.7	19.8	4.2	23.0	27.1	19.9
Female	4.9	18.0	12.8	1.8	22.7	31.4	22.5
Race/ethnicity							
White; non-Hispanic	6.2	15.8	17.1	1.8	22.6	31.3	20.6
Asian/Pacific Islander	1.9	low n	low n	low n	low n	low n	low n
Black; non-Hispanic	3.4	11.7	11.3	1.7	31.3	18.0	34.2
Hispanic	4.1	19.1	17.5	16.3	17.3	23.7	14.6
American Indian/Alaskan Native	13.4	low n	low n	low n	low n	low n	low n
Dependency status							
Dependent	4.6	16.8	13.6	4.3	9.0	44.2	19.0
Independent	6.4	16.0	18.1	2.1	32.4	19.0	22.6
Dependency status							
Dependent	4.6	16.8	13.6	4.3	9.0	44.2	19.0
Independent; No dependents, unmarried	7.0	22.8	11.9	0.8	34.4	19.4	20.4
Independent; No dependents, married	4.5	11.4	36.8	0.0	36.4	11.0	14.2
Independent; With dependents	6.8	12.4	17.6	3.5	29.9	20.8	26.5
Income and dependency status							
Dependent; Less than $20,000	4.4	21.5	9.2	10.6	9.2	43.6	9.7
Dependent; $20,000-$39,999	4.1	16.9	8.8	4.1	11.6	45.1	21.4
Dependent; $40,000-$59,999	4.3	16.5	19.9	0.7	12.2	36.4	27.1
Dependent; $60,000-$79,999	4.2	15.7	15.6	1.5	5.7	40.9	22.3
Dependent; $80,000-$99,999	5.5	5.6	28.4	14.5	2.7	42.6	10.8
Dependent; $100,000 or more	6.4	19.9	5.2	0.3	7.7	58.4	16.1
Independent; Less than $10,000	7.4	9.7	8.1	3.0	32.7	27.0	32.6
Independent; $10,000-$19,999	7.7	21.1	12.4	1.5	28.6	18.0	27.1
Independent; $20,000-$29,999	6.2	17.8	30.3	4.3	31.2	15.4	12.8
Independent; $30,000-$49,999	5.7	22.1	28.2	0.1	36.5	12.5	11.9
Independent; $50,000 or more	4.4	9.5	25.9	1.0	36.1	15.4	15.8
Marital status							
Not married	5.3	17.8	13.5	3.0	17.2	34.1	22.8
Married	5.8	13.6	25.2	3.0	37.1	14.8	17.0
Separated	9.1	2.5	13.0	1.2	45.9	26.8	14.5

See explanatory information and SOURCES at end of table.

Appendix table 3-16. Percentage of undergraduates who reported a disability and among those with disabilities, the type of disability: 1995-1996

Page 3 of 3

	Any disabilities	Type of disability reported among those reporting a disability					
		Visual	Hearing	Speech	Orthopedic	Learning disability	Other
Parents' education							
Less than high school diploma	7.1	16.1	20.9	4.1	36.8	15.9	20.4
High school diploma or equivalent	5.6	23.7	17.9	2.3	25.7	20.9	17.4
Some postsecondary education	5.8	14.3	14.6	0.4	23.0	37.5	20.9
Bachelor's degree or higher	5.4	13.4	17.9	3.8	12.7	41.7	19.8
Primary role if working while enrolled							
Student working to meet expenses	4.5	17.9	15.6	1.5	12.3	45.0	15.0
Employee enrolled in school	4.5	26.9	24.2	3.5	23.3	19.4	8.5

SOURCE: National Center for Education Statistics, 1996 National Postsecondary Student Aid Study data analysis system.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 3-17. Full-time undergraduate enrollment at all institutions, by sex and race/ethnicity: Fall 1976-1994, selected years

Enrollment status, sex, and race/ethnicity	1976	1980	1990	1991	1992	1993	1994
Full-time undergraduate enrollment:							
Total, all races and ethnicities	6,115,948	6,464,633	7,058,865	7,346,260	7,369,223	7,302,852	7,287,543
Non-resident aliens	109,147	166,114	167,228	176,693	188,885	196,806	203,280
White, non-Hispanic	4,959,703	5,133,039	5,403,802	5,510,013	5,437,032	5,310,930	5,216,002
Asian or Pacific Islander	106,424	144,691	298,070	339,467	367,609	387,105	416,090
Underrepresented minorities	940,675	1,020,788	1,189,765	1,320,087	1,375,697	1,408,011	1,452,171
Black, non-Hispanic	627,230	650,728	670,892	733,802	753,189	763,883	776,887
American Indian or Alaskan Native	40,227	40,471	50,769	57,339	60,942	62,710	66,169
Hispanic	273,218	329,589	468,104	528,946	561,566	581,418	609,115
Men, all races and ethnicities	3,280,896	3,268,722	3,367,828	3,484,304	3,473,410	3,430,498	3,388,062
Non-resident aliens	77,669	116,471	99,043	103,606	108,439	111,328	114,224
White, non-Hispanic	2,693,974	2,622,125	2,609,128	2,648,578	2,598,252	2,531,133	2,461,618
Asian or Pacific Islander	58,801	77,250	155,377	174,480	187,040	195,676	208,493
Underrepresented minorities	450,452	452,876	504,280	557,640	579,679	592,361	603,727
Black, non-Hispanic	287,359	279,140	275,249	299,931	305,603	309,775	308,954
American Indian or Alaskan Native	20,799	19,176	22,494	25,081	26,785	27,690	28,791
Hispanic	142,295	154,560	206,537	232,628	247,291	254,896	265,982
Women, all races and ethnicities	2,835,052	3,195,911	3,691,037	3,861,956	3,895,813	3,872,354	3,899,481
Non-resident aliens	31,478	49,644	68,185	73,087	80,446	85,478	89,056
White, non-Hispanic	2,265,729	2,510,914	2,794,674	2,861,435	2,838,780	2,779,797	2,754,384
Asian or Pacific Islander	47,623	67,441	142,693	164,987	180,569	191,429	207,597
Underrepresented minorities	490,222	567,912	685,485	762,447	796,018	815,650	848,444
Black, non-Hispanic	339,872	371,588	395,643	433,871	447,586	454,108	467,933
American Indian or Alaskan Native	19,427	21,295	28,275	32,258	34,157	35,020	37,378
Hispanic	130,923	175,029	261,567	296,318	314,275	326,522	343,133
Percentage distribution:							
Total, all races and ethnicities	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Non-resident aliens	1.8%	2.6%	2.4%	2.4%	2.6%	2.7%	2.8%
White, non-Hispanic	81.1%	79.4%	76.6%	75.0%	73.8%	72.7%	71.6%
Asian or Pacific Islander	1.7%	2.2%	4.2%	4.6%	5.0%	5.3%	5.7%
Underrepresented minorities	15.4%	15.8%	16.9%	18.0%	18.7%	19.3%	19.9%
Black, non-Hispanic	10.3%	10.1%	9.5%	10.0%	10.2%	10.5%	10.7%
American Indian or Alaskan Native	0.7%	0.6%	0.7%	0.8%	0.8%	0.9%	0.9%
Hispanic	4.5%	5.1%	6.6%	7.2%	7.6%	8.0%	8.4%
Men, all races and ethnicities	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Non-resident aliens	2.4%	3.6%	2.9%	3.0%	3.1%	3.2%	3.4%
White, non-Hispanic	82.1%	80.2%	77.5%	76.0%	74.8%	73.8%	72.7%
Asian or Pacific Islander	1.8%	2.4%	4.6%	5.0%	5.4%	5.7%	6.2%
Underrepresented minorities	13.7%	13.9%	15.0%	16.0%	16.7%	17.3%	17.8%
Black, non-Hispanic	8.8%	8.5%	8.2%	8.6%	8.8%	9.0%	9.1%
American Indian or Alaskan Native	0.6%	0.6%	0.7%	0.7%	0.8%	0.8%	0.8%
Hispanic	4.3%	4.7%	6.1%	6.7%	7.1%	7.4%	7.9%

See explanatory information and SOURCES at end of table.

Appendix table 3-17. Full-time undergraduate enrollment at all institutions, by sex and race/ethnicity: Fall 1976-1994, selected years

Page 2 of 2

Enrollment status, sex, and race/ethnicity	1976	1980	1990	1991	1992	1993	1994
Women, all races and ethnicities	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Non-resident aliens	1.1%	1.6%	1.8%	1.9%	2.1%	2.2%	2.3%
White, non-Hispanic	79.9%	78.6%	75.7%	74.1%	72.9%	71.8%	70.6%
Asian or Pacific Islander	1.7%	2.1%	3.9%	4.3%	4.6%	4.9%	5.3%
Underrepresented minorities	17.3%	17.8%	18.6%	19.7%	20.4%	21.1%	21.8%
Black, non-Hispanic	12.0%	11.6%	10.7%	11.2%	11.5%	11.7%	12.0%
American Indian or Alaskan Native	0.7%	0.7%	0.8%	0.8%	0.9%	0.9%	1.0%
Hispanic	4.6%	5.5%	7.1%	7.7%	8.1%	8.4%	8.8%

NOTE: Other/unknown races and ethnicities have been distributed proportionately across groups. Because of rounding, details may not sum to totals.

SOURCES: U.S. Department of Education/NCES. Opening Fall Enrollment Survey; tabulations by National Science Foundation/SRS.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 3-18. Total enrollment of undergraduate students at 4-year institutions, by sex and race/ethnicity: Fall 1976-1994, selected years

Page 1 of 2

Sex and race/ethnicity	1976	1980	1990	1991	1992	1993	1994
Total, all races and ethnicities	5,817,054	6,221,800	6,885,028	7,022,691	7,052,237	7,002,998	6,995,459
Non-resident aliens	104,095	148,390	152,506	161,540	168,104	177,544	178,817
White, non-Hispanic	4,814,720	5,046,806	5,369,517	5,383,074	5,331,003	5,221,426	5,144,889
Asian or Pacific Islander	94,595	127,838	275,628	306,922	327,958	344,257	367,037
Underrepresented minorities	803,644	898,767	1,087,377	1,171,155	1,225,172	1,259,771	1,304,716
Black, non-Hispanic	539,101	568,596	623,825	665,212	693,091	706,786	718,519
American Indian or Alaskan Native	31,349	33,202	43,458	46,609	50,540	52,251	55,668
Hispanic	233,194	296,969	420,094	459,334	481,541	500,734	530,529
Men, all races and ethnicities	3,054,310	3,067,023	3,209,162	3,261,228	3,263,958	3,234,775	3,204,347
Non-resident aliens	72,410	101,700	92,217	95,495	97,983	101,775	101,888
White, non-Hispanic	2,556,148	2,507,750	2,523,052	2,522,590	2,490,258	2,435,891	2,381,236
Asian or Pacific Islander	50,781	66,937	142,013	155,857	165,281	172,410	182,057
Underrepresented minorities	374,971	390,636	451,880	487,286	510,436	524,699	539,166
Black, non-Hispanic	241,226	238,714	249,137	265,562	277,907	282,921	282,751
American Indian or Alaskan Native	15,716	15,138	18,456	19,776	21,804	22,383	23,776
Hispanic	118,029	136,784	184,287	201,948	210,725	219,395	232,639
Women, all races and ethnicities	2,762,744	3,154,777	3,675,866	3,761,463	3,788,279	3,768,223	3,791,112
Non-resident aliens	31,685	46,691	60,289	66,045	70,121	75,769	76,929
White, non-Hispanic	2,258,572	2,539,055	2,846,465	2,860,484	2,840,745	2,785,535	2,763,653
Asian or Pacific Islander	43,814	60,900	133,615	151,065	162,677	171,847	184,980
Underrepresented minorities	428,673	508,131	635,497	683,869	714,736	735,072	765,550
Black, non-Hispanic	297,875	329,882	374,688	399,650	415,184	423,865	435,768
American Indian or Alaskan Native	15,633	18,064	25,002	26,833	28,736	29,868	31,892
Hispanic	115,165	160,185	235,807	257,386	270,816	281,339	297,890
Percentage distribution:							
Total, all races and ethnicities	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Non-resident aliens	1.8%	2.4%	2.2%	2.3%	2.4%	2.5%	2.6%
White, non-Hispanic	82.8%	81.1%	78.0%	76.7%	75.6%	74.6%	73.5%
Asian or Pacific Islander	1.6%	2.1%	4.0%	4.4%	4.7%	4.9%	5.2%
Underrepresented minorities	13.8%	14.4%	15.8%	16.7%	17.4%	18.0%	18.7%
Black, non-Hispanic	9.3%	9.1%	9.1%	9.5%	9.8%	10.1%	10.3%
American Indian or Alaskan Native	0.5%	0.5%	0.7%	0.7%	0.7%	0.8%	0.8%
Hispanic	4.0%	4.8%	6.1%	6.5%	6.8%	7.2%	7.6%
Men, all races and ethnicities	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Non-resident aliens	2.4%	3.3%	2.9%	2.9%	3.0%	3.1%	3.2%
White, non-Hispanic	83.7%	81.8%	78.6%	77.4%	76.3%	75.3%	74.3%
Asian or Pacific Islander	1.7%	2.2%	4.4%	4.8%	5.1%	5.3%	5.7%
Underrepresented minorities	12.3%	12.7%	14.1%	14.9%	15.6%	16.2%	16.8%
Black, non-Hispanic	7.9%	7.8%	7.8%	8.1%	8.5%	8.7%	8.8%
American Indian or Alaskan Native	0.5%	0.5%	0.6%	0.7%	0.7%	0.7%	0.8%
Hispanic	3.9%	4.5%	5.7%	6.2%	6.5%	6.8%	7.3%

See explanatory information and SOURCES at end of table.

Appendix table 3-18. Total enrollment of undergraduate students at 4-year institutions, by sex and race/ethnicity: Fall 1976-1994, selected years

Page 2 of 2

Sex and race/ethnicity	1976	1980	1990	1991	1992	1993	1994
Women, all races and ethnicities	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Non-resident aliens	1.1%	1.5%	1.6%	1.8%	1.9%	2.0%	2.0%
White, non-Hispanic	81.8%	80.5%	77.4%	76.0%	75.0%	73.9%	72.9%
Asian or Pacific Islander	1.6%	1.9%	3.6%	4.0%	4.3%	4.6%	4.9%
Underrepresented minorities	15.5%	16.1%	17.3%	18.2%	18.9%	19.5%	20.2%
Black, non-Hispanic	10.8%	10.5%	10.2%	10.6%	11.0%	11.2%	11.5%
American Indian or Alaskan Native	0.5%	0.6%	0.7%	0.7%	0.7%	0.8%	0.9%
Hispanic	4.2%	5.1%	6.4%	6.8%	7.1%	7.5%	7.9%

NOTE: Other/unknown races and ethnicities have been distributed proportionately across groups. Because of rounding, details may not sum to totals.

SOURCES: U.S. Department of Education/NCES. Opening Fall Enrollment Survey; tabulations by National Science Foundation/SRS.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 3-19. Full-time enrollment of undergraduate students at 4-year institutions, by sex and race/ethnicity: Fall 1976-1994, selected years

Page 1 of 2

Enrollment status, sex, and race/ethnicity	1976	1980	1990	1991	1992	1993	1994
Full-time undergraduate enrollment:							
Total, all races and ethnicities	4,537,069	4,791,348	5,203,951	5,294,761	5,316,878	5,284,009	5,284,387
Non-resident aliens	85,692	127,984	128,058	137,071	143,333	148,741	153,500
White, non-Hispanic	3,756,543	3,876,203	4,038,333	4,030,899	3,987,547	3,911,740	3,860,336
Asian or Pacific Islander	73,517	99,013	222,293	247,344	265,362	278,996	299,211
Underrepresented minorities	621,317	688,148	815,267	879,447	920,636	944,532	971,340
Black, non-Hispanic	419,221	437,685	469,530	500,469	520,585	529,951	537,647
American Indian or Alaskan Native	22,896	23,431	30,782	33,174	35,955	37,373	39,930
Hispanic	179,200	227,032	314,955	345,804	364,096	377,208	393,763
Men, all races and ethnicities	2,420,847	2,425,891	2,498,502	2,531,410	2,533,795	2,510,810	2,486,699
Non-resident aliens	61,750	90,111	78,567	82,234	84,692	86,911	88,700
White, non-Hispanic	2,028,318	1,980,989	1,958,708	1,949,542	1,923,254	1,881,930	1,839,438
Asian or Pacific Islander	39,772	52,158	114,752	126,025	134,326	140,439	148,925
Underrepresented minorities	291,007	302,633	346,475	373,609	391,523	401,530	409,636
Black, non-Hispanic	189,003	186,410	193,557	206,408	215,067	218,816	218,632
American Indian or Alaskan Native	11,816	11,183	13,694	14,606	16,060	16,726	17,771
Hispanic	90,188	105,041	139,224	152,595	160,396	165,988	173,233
Women, all races and ethnicities	2,116,222	2,365,457	2,705,449	2,763,351	2,783,083	2,773,199	2,797,688
Non-resident aliens	23,942	37,874	49,491	54,837	58,641	61,830	64,800
White, non-Hispanic	1,728,225	1,895,213	2,079,625	2,081,357	2,064,293	2,029,810	2,020,898
Asian or Pacific Islander	33,745	46,855	107,541	121,319	131,036	138,557	150,286
Underrepresented minorities	330,310	385,515	468,792	505,838	529,113	543,002	561,704
Black, non-Hispanic	230,218	251,275	275,973	294,061	305,518	311,135	319,015
American Indian or Alaskan Native	11,081	12,248	17,088	18,568	19,895	20,647	22,159
Hispanic	89,012	121,991	175,731	193,209	203,700	211,220	220,530
Percentage distribution:							
Total, all races and ethnicities	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Non-resident aliens	1.9%	2.7%	2.5%	2.6%	2.7%	2.8%	2.9%
White, non-Hispanic	82.8%	80.9%	77.6%	76.1%	75.0%	74.0%	73.1%
Asian or Pacific Islander	1.6%	2.1%	4.3%	4.7%	5.0%	5.3%	5.7%
Underrepresented minorities	13.7%	14.4%	15.7%	16.6%	17.3%	17.9%	18.4%
Black, non-Hispanic	9.2%	9.1%	9.0%	9.5%	9.8%	10.0%	10.2%
American Indian or Alaskan Native	0.5%	0.5%	0.6%	0.6%	0.7%	0.7%	0.8%
Hispanic	3.9%	4.7%	6.1%	6.5%	6.8%	7.1%	7.5%
Men, all races and ethnicities	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Non-resident aliens	2.6%	3.7%	3.1%	3.2%	3.3%	3.5%	3.6%
White, non-Hispanic	83.8%	81.7%	78.4%	77.0%	75.9%	75.0%	74.0%
Asian or Pacific Islander	1.6%	2.2%	4.6%	5.0%	5.3%	5.6%	6.0%
Underrepresented minorities	12.0%	12.5%	13.9%	14.8%	15.5%	16.0%	16.5%
Black, non-Hispanic	7.8%	7.7%	7.7%	8.2%	8.5%	8.7%	8.8%
American Indian or Alaskan Native	0.5%	0.5%	0.5%	0.6%	0.6%	0.7%	0.7%
Hispanic	3.7%	4.3%	5.6%	6.0%	6.3%	6.6%	7.0%

See explanatory information and SOURCES at end of table.

Appendix table 3-19. Full-time enrollment of undergraduate students at 4-year institutions, by sex and race/ethnicity: Fall 1976-1994, selected years

Enrollment status, sex, and race/ethnicity	1976	1980	1990	1991	1992	1993	1994
Women, all races and ethnicities	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Non-resident aliens	1.1%	1.6%	1.8%	2.0%	2.1%	2.2%	2.3%
White, non-Hispanic	81.7%	80.1%	76.9%	75.3%	74.2%	73.2%	72.2%
Asian or Pacific Islander	1.6%	2.0%	4.0%	4.4%	4.7%	5.0%	5.4%
Underrepresented minorities	15.6%	16.3%	17.3%	18.3%	19.0%	19.6%	20.1%
Black, non-Hispanic	10.9%	10.6%	10.2%	10.6%	11.0%	11.2%	11.4%
American Indian or Alaskan Native	0.5%	0.5%	0.6%	0.7%	0.7%	0.7%	0.8%
Hispanic	4.2%	5.2%	6.5%	7.0%	7.3%	7.6%	7.9%

NOTE: Other/unknown races and ethnicities have been distributed proportionately across groups. Because of rounding, details may not sum to totals.

SOURCES: U.S. Department of Education/NCES. Opening Fall Enrollment Survey; tabulations by National Science Foundation/SRS.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 3-20. Percentage distribution of persons 18-24 years of age in total population, total enrollment of undergraduate students at 4-year institutions, and the index of representation, by race/ethnicity and sex: 1980, 1990-1994[1]

Race/ethnicity and sex	1980 Percent of 18-24 years population	1980 Percent of 4-year college enrollment	1980 Index of represention	1990 Percent of 18-24 years population	1990 Percent of 4-year college enrollment	1990 Index of represention	1991 Percent of 18-24 years population	1991 Percent of 4-year college enrollment	1991 Index of represention
White males	38.92	41.29	106.10	35.72	37.48	104.90	35.49	36.77	103.59
Asian males	0.78	1.10	140.58	1.67	2.11	126.33	1.74	2.27	130.29
Black males	6.19	3.93	63.48	6.65	3.70	55.69	6.72	3.87	57.63
Hispanic males	3.93	2.25	57.26	6.54	2.74	41.87	6.62	2.94	44.45
American Indian males	0.34	0.25	73.56	0.41	0.27	66.26	0.42	0.29	67.90
White females	38.41	41.81	108.83	34.69	42.28	121.87	34.41	41.69	121.14
Asian females	0.77	1.00	130.11	1.57	1.98	126.18	1.66	2.20	132.63
Black females	6.67	5.43	81.47	6.90	5.57	80.72	6.94	5.82	83.89
Hispanic females	3.65	2.64	72.18	5.46	3.50	64.19	5.58	3.75	67.19
American Indian females	0.33	0.30	90.44	0.40	0.37	94.00	0.40	0.39	97.34

Race/ethnicity and sex	1992 Percent of 18-24 years population	1992 Percent of 4-year college enrollment	1992 Index of represention	1993 Percent of 18-24 years population	1993 Percent of 4-year college enrollment	1993 Index of represention	1994 Percent of 18-24 years population	1994 Percent of 4-year college enrollment	1994 Index of represention
White males	35.21	36.17	102.74	35.03	35.69	101.88	34.80	34.93	100.38
Asian males	1.84	2.40	130.30	1.92	2.53	131.44	1.98	2.67	134.66
Black males	6.79	4.04	59.47	6.83	4.15	60.69	6.91	4.15	60.04
Hispanic males	6.68	3.06	45.82	6.70	3.21	47.94	6.75	3.41	50.59
American Indian males	0.44	0.32	72.71	0.44	0.33	74.45	0.45	0.35	77.97
White females	34.12	41.27	120.93	33.90	40.81	120.39	33.62	40.54	120.58
Asian females	1.78	2.36	132.98	1.87	2.52	134.84	1.95	2.71	139.04
Black females	7.00	6.03	86.11	7.03	6.21	88.31	7.11	6.39	89.96
Hispanic females	5.72	3.93	68.72	5.85	4.12	70.45	6.00	4.37	72.81
American Indian females	0.42	0.42	100.27	0.42	0.44	102.99	0.43	0.47	108.42

[1]The number of cases for the percent distributions are presented in appendix table 3-21. Nonresident aliens were not included in these calculations. The numbers displayed may not be exact due to rounding error.

SOURCES: U.S. Department of Education/NCES Opening Fall Enrollment Survey and U.S. Bureau of the Census, Current Population Reports, tabulations by National Science Foundation/SRS.

Appendix table 3-21. Number of persons 18-24 years of age in total population and total 4-year college enrollment, by race/ethnicity and sex: 1980, 1990-1994

Page 1 of 1

	1980		1990		1991	
Race/ethnicity and sex	18-24 year old population	Total 4-year college enrollment	18-24 year old population	Total 4-year college enrollment	18-24 year old population	Total 4-year college enrollment
Total	30,103,000	6,073,409	26,831,000	6,732,522	26,384,000	6,861,151
White males	11,715,000	2,507,750	9,585,000	2,523,052	9,364,000	2,522,590
Asian males	236,000	66,937	448,000	142,013	460,000	155,857
Black males	1,864,000	238,714	1,783,000	249,137	1,772,000	265,562
Hispanic males	1,184,000	136,784	1,754,000	184,287	1,747,000	201,948
American Indian males	102,000	15,138	111,000	18,456	112,000	19,776
White females	11,564,000	2,539,055	9,308,000	2,846,465	9,080,000	2,860,484
Asian females	232,000	60,900	422,000	133,615	438,000	151,065
Black females	2,007,000	329,882	1,850,000	374,688	1,832,000	399,650
Hispanic females	1,100,000	160,185	1,464,000	235,807	1,473,000	257,386
American Indian females	99,000	18,064	106,000	25,002	106,000	26,833

	1992		1993		1994	
Race/ethnicity and sex	18-24 year old population	Total 4-year college enrollment	18-24 year old population	Total 4-year college enrollment	18-24 year old population	Total 4-year college enrollment
Total	25,942,000	6,884,133	25,653,000	6,825,454	25,260,000	6,816,642
White males	9,134,000	2,490,258	8,986,000	2,435,891	8,791,000	2,381,236
Asian males	478,000	165,281	493,000	172,410	501,000	182,057
Black males	1,761,000	277,907	1,752,000	282,921	1,745,000	282,751
Hispanic males	1,733,000	210,725	1,720,000	219,395	1,704,000	232,639
American Indian males	113,000	21,804	113,000	22,383	113,000	23,776
White females	8,852,000	2,840,745	8,696,000	2,785,535	8,493,000	2,763,653
Asian females	461,000	162,677	479,000	171,847	493,000	184,980
Black females	1,817,000	415,184	1,804,000	423,865	1,795,000	435,768
Hispanic females	1,485,000	270,816	1,501,000	281,339	1,516,000	297,890
American Indian females	108,000	28,736	109,000	29,868	109,000	31,892

NOTE: These data do not include nonresident aliens; and U.S. citizens and permanent residents for whom their race/ethnicity is unknown.

SOURCES: U.S. Department of Education/NCES Opening Fall Enrollment Survey and U.S. Bureau of the Census, Current Population Reports, tabulations by National Science Foundation/SRS.

Appendix table 3-22. Percentage distribution of full-time, first-time, first-year students attending 4-year colleges in 1990, percentage distribution of earned bachelor's degrees in 1994, and the index of representation, by race/ethnicity, sex, and field of degree[1]

Race/ethnicity and sex	Number of full-time, first-time, first-year 1990 4-year college enrollment	Percent of full-time, first-time, first-year 1990 4-year college enrollment	Total degrees: Percent distribution of earned bachelor's degrees	Total degrees: Index of representation	Engineering: Percent distribution of earned bachelor's degrees	Engineering: Index of representation	Physical sciences: Percent distribution of earned bachelor's degrees	Physical sciences: Index of representation
White males	385,984	36.8	37.4	101.47	66.1	179.41	57.1	154.87
Asian males	24,904	2.4	2.4	98.88	9.1	384.79	3.7	156.20
Black males	48,485	4.6	2.7	57.87	3.1	67.35	2.7	57.45
Hispanic males	31,614	3.0	2.3	76.24	4.4	144.46	2.4	78.80
American Indian males	3,024	0.3	0.2	78.96	0.3	108.35	0.3	103.23
White females	418,445	39.9	44.3	110.90	12.0	30.00	26.7	66.82
Asian females	24,860	2.4	2.5	105.93	2.2	94.32	2.6	108.18
Black females	67,517	6.4	4.6	72.07	1.5	23.72	2.6	40.63
Hispanic females	39,134	3.7	3.3	87.70	1.1	30.31	1.8	48.78
American Indian females	3,503	0.3	0.3	93.18	0.1	20.38	0.2	53.12

Race/ethnicity and sex	Mathematical science: Percent distribution of earned bachelor's degrees	Mathematical science: Index of representation	Computer science: Percent distribution of earned bachelor's degrees	Computer science: Index of representation	Biological science: Percent distribution of earned bachelor's degrees	Biological science: Index of representation	Agricultural science: Percent distribution of earned bachelor's degrees	Agricultural science: Index of representation
White males	43.5	118.05	55.5	150.53	37.7	102.43	58.1	157.70
Asian males	3.8	161.64	6.8	286.43	6.0	251.55	0.6	27.33
Black males	3.4	72.55	5.4	115.73	1.9	40.03	1.1	23.45
Hispanic males	2.2	73.04	3.3	109.91	2.6	85.97	1.5	50.68
American Indian males	0.2	73.81	0.3	94.29	0.2	77.55	0.5	181.17
White females	38.0	95.08	17.5	43.82	38.1	95.37	34.9	87.28
Asian females	3.0	124.77	3.6	149.88	5.9	249.89	0.7	30.38
Black females	3.9	60.99	5.7	88.54	4.1	63.67	1.0	16.11
Hispanic females	1.8	47.79	1.9	51.37	3.2	85.76	1.1	30.33
American Indian females	0.2	65.92	0.1	26.21	0.3	80.09	0.3	101.89

See explanatory information and SOURCES at end of table.

Appendix table 3-22. Percentage distribution of full-time, first-time, first-year students attending 4-year colleges in 1990, percentage distribution of earned bachelor's degrees, distribution of earned bachelor's degrees in 1994, and the index of representation, by race/ethnicity, sex, and field of degree[1]

Race/ethnicity and sex	Social sciences		Psychology		Non-science and engineering	
	Percent distribution of earned bachelor's degrees	Index of representation	Percent distribution of earned bachelor's degrees	Index of representation	Percent distribution of earned bachelor's degrees	Index of representation
White males	43.9	119.19	22.1	60.08	34.0	92.13
Asian males	2.4	101.33	1.2	50.46	1.5	64.14
Black males	3.5	75.44	1.8	39.57	2.6	55.52
Hispanic males	2.8	94.03	1.5	49.06	2.1	69.13
American Indian males	0.3	102.88	0.2	58.19	0.2	71.81
White females	36.4	91.20	59.4	148.78	48.7	121.84
Asian females	2.6	111.59	2.9	123.40	2.2	94.27
Black females	4.7	72.22	6.0	92.35	4.9	75.87
Hispanic females	3.0	79.98	4.5	119.13	3.5	94.39
American Indian females	0.3	94.89	0.4	124.91	0.3	99.66

[1]The numbers of cases for the percent distributions of earned bachelor's degrees are presented in text table 3-6.

NOTE: These data do not include nonresident aliens; and U.S. citizens and permanent residents for whom their race/ethnicity is unknown.

SOURCE: U.S. Department of Education/National Center for Education Statistics, Opening Fall Enrollments Survey and Completions Survey, tabulations by National Science Foundation/SRS.

Appendix table 3-23. Percentage distribution of full-time, first-time, first-year students attending 4-year colleges in 1991, percentage distribution of earned bachelor's degrees in 1995, and the index of representation, by race/ethnicity, sex, and field of degree[1]

Race/ethnicity and sex	Number of full-time first-time first-year 1991 4-year college enrollment	Percent of full-time first-time first-year 1991 4-year college enrollment	Total degrees: Percent distribution of earned bachelor's degrees	Total degrees: Index of representation	Engineering: Percent distribution of earned bachelor's degrees	Engineering: Index of representation	Physical sciences: Percent distribution of earned bachelor's degrees	Physical sciences: Index of representation
White males	371,494	35.9	36.7	102.04	64.3	178.90	54.9	152.75
Asian males	25,873	2.5	2.6	102.01	9.3	372.89	4.3	171.85
Black males	50,317	4.9	2.8	57.36	3.2	66.28	2.7	55.79
Hispanic males	34,283	3.3	2.5	75.70	5.1	152.56	2.4	72.29
American Indian males	3,024	0.3	0.2	82.17	0.3	105.15	0.4	123.78
White females	406,538	39.3	43.7	111.22	12.1	30.85	27.1	69.00
Asian females	27,228	2.6	2.8	105.82	2.5	95.88	3.1	117.27
Black females	68,697	6.6	4.9	73.58	1.7	26.27	3.0	44.50
Hispanic females	42,756	4.1	3.5	84.52	1.3	31.95	2.0	48.15
American Indian females	3,721	0.4	0.3	94.71	0.1	21.85	0.2	48.77

Race/ethnicity and sex	Mathematical science: Percent distribution of earned bachelor's degrees	Mathematical science: Index of representation	Computer science: Percent distribution of earned bachelor's degrees	Computer science: Index of representation	Biological science: Percent distribution of earned bachelor's degrees	Biological science: Index of representation	Agricultural science: Percent distribution of earned bachelor's degrees	Agricultural science: Index of representation
White males	42.3	117.74	54.1	150.48	36.5	101.48	57.5	160.00
Asian males	4.0	160.81	7.3	290.02	6.4	255.26	0.9	36.64
Black males	3.7	75.84	5.7	116.91	1.8	37.14	0.9	17.53
Hispanic males	2.4	73.66	4.0	121.12	2.5	74.46	1.6	48.49
American Indian males	0.2	76.88	0.3	114.43	0.2	80.63	0.6	197.72
White females	37.9	96.37	17.1	43.60	38.4	97.64	35.0	89.10
Asian females	3.5	131.32	3.6	136.14	6.6	250.18	1.1	42.04
Black females	4.0	60.57	5.8	86.73	4.1	62.39	1.0	15.07
Hispanic females	1.7	41.44	2.0	47.78	3.2	77.97	1.1	26.94
American Indian females	0.2	62.48	0.2	47.13	0.3	80.37	0.3	82.30

See explanatory information and SOURCES at end of table.

Appendix table 3-23. Percentage distribution of full-time, first-time, first-year students attending 4-year colleges in 1991, percentage distribution of earned bachelor's degrees in 1995, and the index of representation, by race/ethnicity, sex, and field of degree[1]

Race/ethnicity and sex	Social sciences		Psychology		Non-science and engineering	
	Percent distribution of earned bachelor's degrees	Index of representation	Percent distribution of earned bachelor's degrees	Index of representation	Percent distribution of earned bachelor's degrees	Index of representation
White males	42.9	119.28	21.8	60.65	33.4	92.96
Asian males	2.6	102.02	1.4	55.37	1.7	66.94
Black males	3.6	73.75	2.0	41.19	2.7	55.57
Hispanic males	3.0	89.49	1.7	50.28	2.3	69.14
American Indian males	0.3	108.34	0.2	58.67	0.2	74.08
White females	36.2	92.08	58.2	147.91	48.0	122.04
Asian females	3.0	112.20	3.4	128.25	2.4	92.29
Black females	5.0	75.22	6.2	93.38	5.2	77.61
Hispanic females	3.2	78.01	4.8	116.77	3.8	91.02
American Indian females	0.3	91.76	0.4	114.03	0.4	103.47

[1]The numbers of cases for the percent distributions of earned bachelor's degrees are presented in text table 3-6.

NOTE: These data do not include nonresident aliens; and U.S. citizens and permanent residents for whom their race/ethnicity is unknown.

SOURCE: U.S. Department of Education/National Center for Education Statistics, Opening Fall Enrollments Survey and Completions Survey, tabulations by National Science Foundation/SRS.

Appendix table 3-24. Full-time enrollment of first-time, first-year students at all institutions, by sex and race/ethnicity: Fall 1976-1994, selected years

Enrollment status, sex, and race/ethnicity	1976	1980	1990	1991	1992	1993	1994
Total, all races and ethnicities	1,081,893	1,132,943	1,068,432	1,055,682	1,064,886	1,077,987	1,076,502
Non-resident aliens	17,504	21,319	20,962	21,751	22,289	21,925	22,002
White, non-Hispanic	889,861	911,879	804,429	778,032	779,514	781,057	778,784
Asian or Pacific Islander	15,550	21,181	49,764	53,101	54,885	57,406	61,772
Underrepresented minorities	158,977	178,564	193,277	202,798	208,198	217,599	213,944
Black, non-Hispanic	108,591	113,244	116,002	119,014	120,226	122,474	122,249
Hispanic	45,223	59,841	70,748	77,039	80,858	87,598	83,427
American Indian or Alaskan Native	5,162	5,479	6,527	6,745	7,114	7,527	8,268
Men, all races and ethnicities	547,612	554,275	506,357	497,751	500,801	505,457	498,778
Non-resident aliens	12,015	14,021	12,346	12,760	12,814	12,389	12,506
White, non-Hispanic	455,667	452,321	385,984	371,494	370,379	370,980	365,219
Asian or Pacific Islander	8,081	10,849	24,904	25,873	26,950	28,186	29,679
Underrepresented minorities	71,850	77,084	83,123	87,624	90,658	93,902	91,374
Black, non-Hispanic	47,683	48,093	48,485	50,317	51,189	51,789	50,895
Hispanic	21,767	26,393	31,614	34,283	36,157	38,664	36,701
American Indian or Alaskan Native	2,399	2,598	3,024	3,024	3,312	3,449	3,778
Women, all races and ethnicities	534,281	578,668	562,075	557,931	564,085	572,530	577,724
Non-resident aliens	5,490	7,298	8,616	8,991	9,475	9,536	9,496
White, non-Hispanic	434,194	459,558	418,445	406,538	409,135	410,077	413,565
Asian or Pacific Islander	7,470	10,332	24,860	27,228	27,935	29,220	32,093
Underrepresented minorities	87,127	101,480	110,154	115,174	117,540	123,697	122,570
Black, non-Hispanic	60,908	65,150	67,517	68,697	69,037	70,685	71,354
Hispanic	23,456	33,449	39,134	42,756	44,701	48,934	46,726
American Indian or Alaskan Native	2,763	2,881	3,503	3,721	3,802	4,078	4,490

Percentage distribution:

Total, all races and ethnicities	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Non-resident aliens	1.6%	1.9%	2.0%	2.1%	2.1%	2.0%	2.0%
White, non-Hispanic	82.3%	80.5%	75.3%	73.7%	73.2%	72.5%	72.3%
Asian or Pacific Islander	1.4%	1.9%	4.7%	5.0%	5.2%	5.3%	5.7%
Underrepresented minorities	14.7%	15.8%	18.1%	19.2%	19.6%	20.2%	19.9%
Black, non-Hispanic	10.0%	10.0%	10.9%	11.3%	11.3%	11.4%	11.4%
Hispanic	4.2%	5.3%	6.6%	7.3%	7.6%	8.1%	7.7%
American Indian or Alaskan Native	4.8%	4.8%	5.6%	5.7%	5.9%	6.1%	6.8%

See explanatory information and SOURCES at end of table.

Appendix table 3-24. Full-time enrollment of first-time, first-year students at all institutions, by sex and race/ethnicity: Fall 1976-1994, selected years

Enrollment status, sex, and race/ethnicity	1976	1980	1990	1991	1992	1993	1994
Men, all races and ethnicities	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Non-resident aliens	2.2%	2.5%	2.4%	2.6%	2.6%	2.5%	2.5%
White, non-Hispanic	83.2%	81.6%	76.2%	74.6%	74.0%	73.4%	73.2%
Asian or Pacific Islander	1.5%	2.0%	4.9%	5.2%	5.4%	5.6%	6.0%
Underrepresented minorities	13.1%	13.9%	16.4%	17.6%	18.1%	18.6%	18.3%
Black, non-Hispanic	8.7%	8.7%	9.6%	10.1%	10.2%	10.2%	10.2%
Hispanic	4.0%	4.8%	6.2%	6.9%	7.2%	7.6%	7.4%
American Indian or Alaskan Native	5.0%	5.4%	6.2%	6.0%	6.5%	6.7%	7.4%
Women, all races and ethnicities	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Non-resident aliens	1.0%	1.3%	1.5%	1.6%	1.7%	1.7%	1.6%
White, non-Hispanic	81.3%	79.4%	74.4%	72.9%	72.5%	71.6%	71.6%
Asian or Pacific Islander	1.4%	1.8%	4.4%	4.9%	5.0%	5.1%	5.6%
Underrepresented minorities	16.3%	17.5%	19.6%	20.6%	20.8%	21.6%	21.2%
Black, non-Hispanic	11.4%	11.3%	12.0%	12.3%	12.2%	12.3%	12.4%
Hispanic	4.4%	5.8%	7.0%	7.7%	7.9%	8.5%	8.1%
American Indian or Alaskan Native	4.5%	4.4%	5.2%	5.4%	5.5%	5.8%	6.3%

NOTE: Other/unknown races and ethnicities have been distributed proportionately across groups. Because of rounding, details may not sum to totals.

SOURCES: U.S. Department of Education/NCES. Opening Fall Enrollment Survey; tabulations by National Science Foundation/SRS.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 3-25. Earned bachelor's degrees conferred by all schools and by historically black colleges and universities (HBCUs) to blacks, by field: 1987-1994, selected years

Field	1987	1989	1990	1991	1992	1993	1994
	Total, all black recipients						
Total science and engineering	17,230	17,385	18,230	19,987	22,431	24,421	26,289
Engineering	2,315	2,067	2,072	2,229	2,362	2,577	2,659
Sciences	14,915	15,318	16,158	17,758	20,069	21,844	23,630
Natural sciences	6,524	6,005	5,782	5,834	6,401	6,972	7,559
Physical science [1]	823	697	650	753	816	836	921
Mathematical science	834	792	720	811	904	965	992
Computer science	2,820	2,457	2,247	1,997	2,090	2,213	2,398
Biological science	1,890	1,916	1,994	2,111	2,385	2,739	2,980
Agricultural science	157	143	171	162	206	219	268
Social sciences	8,391	9,313	10,376	11,924	13,668	14,872	16,071
Social science	5,940	6,570	7,226	8,236	9,489	10,254	10,835
Psychology	2,451	2,743	3,150	3,688	4,179	4,618	5,236
Non-S&E [2]	37,873	39,452	41,071	45,022	48,880	52,246	56,027
Grand total	55,103	56,837	59,301	65,009	71,311	76,667	82,316
	Total, all black recipients from HBCUs						
Total science and engineering	5,229	5,054	5,190	5,679	6,363	7,368	7,804
Engineering	557	474	524	589	594	700	690
Sciences	4,672	4,580	4,666	5,090	5,769	6,668	7,114
Natural sciences	2,750	2,513	2,353	2,363	2,599	3,021	3,105
Physical science [1]	346	320	296	358	376	390	421
Mathematical science	425	381	307	369	420	463	449
Computer science	1,187	1,048	899	748	780	904	904
Biological science	714	693	764	792	906	1,155	1,197
Agricultural science	78	71	87	96	117	109	134
Social sciences	1,922	2,067	2,313	2,727	3,170	3,647	4,009
Social science	1,457	1,517	1,651	1,886	2,201	2,507	2,701
Psychology	465	550	662	841	969	1,140	1,308
Non-S&E [2]	11,360	10,871	11,155	12,284	13,346	14,481	15,622
Grand total	16,589	15,925	16,345	17,963	19,709	21,849	23,426

See explanatory information and SOURCES at end of table.

Appendix table 3-25. Earned bachelor's degrees conferred by all schools and by historically black colleges and universities (HBCUs) to blacks, by field: 1987-1994, selected years

Field	1987	1989	1990	1991	1992	1993	1994
	Percentage from HBCUs						
Total science and engineering	30.3	29.1	28.5	28.4	28.4	30.2	29.7
Engineering	24.1	22.9	25.3	26.4	25.1	27.2	25.9
Sciences	31.3	29.9	28.9	28.7	28.7	30.5	30.1
Natural sciences	42.2	41.8	40.7	40.5	40.6	43.3	41.1
Physical science [1]	42.0	45.9	45.5	47.5	46.1	46.7	45.7
Mathematical science	51.0	48.1	42.6	45.5	46.5	48.0	45.3
Computer science	42.1	42.7	40.0	37.5	37.3	40.8	37.7
Biological science	37.8	36.2	38.3	37.5	38.0	42.2	40.2
Agricultural science	49.7	49.7	50.9	59.3	56.8	49.8	50.0
Social sciences	22.9	22.2	22.3	22.9	23.2	24.5	24.9
Social science	24.5	23.1	22.8	22.9	23.2	24.4	24.9
Psychology	19.0	20.1	21.0	22.8	23.2	24.7	25.0
Non-S&E [2]	30.0	27.6	27.2	27.3	27.3	27.7	27.9
Grand total	30.1	28.0	27.6	27.6	27.6	28.5	28.5

[1] In this table, "Physical science" includes earth, atmospheric, and ocean sciences, as well as physics, astronomy, and chemistry.

[2] Non-S&E refers to non-science and non-engineering.

NOTES: Data on race/ethnicity were collected biennially from 1977 through 1989 and annually thereafter. Data on race/ethnicity of degree recipients are collected on broad fields of study only; therefore, these data could not be adjusted to the exact field taxonomies used by NSF. Racial/ethnic categories are as designated on the survey form. These categories include U.S. citizens and foreign citizens on permanent visas (i.e., resident aliens who have been admitted for permanent residency).

SOURCE: Tabulations by National Science Foundation/SRS; data from National Center for Education Statistics IPEDS Completions Surveys, 1987-1994.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 3-26. Earned bachelor's degrees conferred by all schools and by historically black colleges and universities (HBCUs) to black men, by field: 1987-1994, selected years

Page 1 of 2

Field	1987	1989	1990	1991	1992	1993	1994
	Total, all recipients						
Total science and engineering	7,886	7,685	7,830	8,448	9,375	10,099	10,806
Engineering	1,606	1,397	1,416	1,484	1,614	1,764	1,784
Sciences	6,280	6,288	6,414	6,964	7,761	8,335	9,022
Natural sciences	2,939	2,732	2,476	2,538	2,709	2,872	3,146
Physical science [1]	433	365	292	391	381	370	464
Mathematical science	399	374	342	380	374	444	457
Computer science	1,284	1,205	1,074	971	1,092	1,049	1,161
Biological science	723	700	658	696	749	883	927
Agricultural science	100	88	110	100	113	126	137
Social sciences	3,341	3,556	3,938	4,426	5,052	5,463	5,876
Social science	2,680	2,911	3,144	3,547	4,070	4,364	4,644
Psychology	661	645	794	879	982	1,099	1,232
Non-S&E [2]	14,056	14,228	14,760	15,790	17,143	18,275	19,300
Grand total	21,942	21,913	22,590	24,238	26,518	28,374	30,106
	Total, all black recipients from HBCUs						
Total science and engineering	2,337	2,112	2,086	2,211	2,450	2,761	2,940
Engineering	371	308	331	359	380	430	425
Sciences	1,966	1,804	1,755	1,852	2,070	2,331	2,515
Natural sciences	1,193	1,056	935	951	972	1,089	1,162
Physical science [1]	156	160	127	163	145	150	197
Mathematical science	213	179	134	164	150	196	181
Computer science	502	460	377	333	364	361	381
Biological science	264	206	231	231	238	317	334
Agricultural science	58	51	66	60	75	65	69
Social sciences	773	748	820	901	1,098	1,242	1,353
Social science	661	621	657	720	868	989	1,060
Psychology	112	127	163	181	230	253	293
Non-S&E [2]	4,239	3,870	3,980	4,219	4,637	5,106	5,517
Grand total	6,576	5,982	6,066	6,430	7,087	7,867	8,457

See explanatory information and SOURCES at end of table.

Appendix table 3-26. Earned bachelor's degrees conferred by all schools and by historically black colleges and universities (HBCUs) to black men, by field: 1987-1994, selected years

Page 2 of 2

Field	1987	1989	1990	1991	1992	1993	1994
	Percentage from HBCUs						
Total science and engineering	29.6	27.5	26.6	26.2	26.1	27.3	27.2
Engineering	23.1	22.0	23.4	24.2	23.5	24.4	23.8
Sciences	31.3	28.7	27.4	26.6	26.7	28.0	27.9
Natural sciences	40.6	38.7	37.8	37.5	35.9	37.9	36.9
Physical science [1]	36.0	43.8	43.5	41.7	38.1	40.5	42.5
Mathematical science	53.4	47.9	39.2	43.2	40.1	44.1	39.6
Computer science	39.1	38.2	35.1	34.3	33.3	34.4	32.8
Biological science	36.5	29.4	35.1	33.2	31.8	35.9	36.0
Agricultural science	58.0	58.0	60.0	60.0	66.4	51.6	50.4
Social sciences	23.1	21.0	20.8	20.4	21.7	22.7	23.0
Social science	24.7	21.3	20.9	20.3	21.3	22.7	22.8
Psychology	16.9	19.7	20.5	20.6	23.4	23.0	23.8
Non-S&E [2]	30.2	27.2	27.0	26.7	27.0	27.9	28.6
Grand total	30.0	27.3	26.9	26.5	26.7	27.7	28.1

[1] In this table, "Physical science" includes earth, atmospheric, and ocean sciences, as well as physics, astronomy, and chemistry.

[2] Non-S&E refers to non-science and non-engineering.

NOTES: Data on race/ethnicity were collected biennially from 1977 through 1989 and annually thereafter. Data on race/ethnicity of degree recipients are collected on broad fields of study only; therefore, these data could not be adjusted to the exact field taxonomies used by NSF. Racial/ethnic categories are as designated on the survey form. These categories include U.S. citizens and foreign citizens on permanent visas (i.e., resident aliens who have been admitted for permanent residency).

SOURCE: Tabulations by National Science Foundation/SRS; data from National Center for Education Statistics IPEDS Completions Surveys, 1987-1994.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 3-27. Earned bachelor's degrees conferred by all schools and by historically black colleges and universities (HBCUs) to black women, by field: 1987-1994, selected years

Page 1 of 2

Field	1987	1989	1990	1991	1992	1993	1994
	Total, all black recipients						
Total science and engineering	9,344	9,700	10,400	11,539	13,056	14,322	15,483
Engineering	709	670	656	745	748	813	875
Sciences	8,635	9,030	9,744	10,794	12,308	13,509	14,608
Natural sciences	3,585	3,273	3,306	3,296	3,692	4,100	4,413
Physical science [1]	390	332	358	362	435	466	457
Mathematical science	435	418	378	431	530	521	535
Computer science	1,536	1,252	1,173	1,026	998	1,164	1,237
Biological science	1,167	1,216	1,336	1,415	1,636	1,856	2,053
Agricultural science	57	55	61	62	93	93	131
Social sciences	5,050	5,757	6,438	7,498	8,616	9,409	10,195
Social science	3,260	3,659	4,082	4,689	5,419	5,890	6,191
Psychology	1,790	2,098	2,356	2,809	3,197	3,519	4,004
Non-S&E [2]	23,817	25,224	26,311	29,232	31,737	33,971	36,727
Grand total	33,161	34,924	36,711	40,771	44,793	48,293	52,210
	Total, all black recipients from HBCUs						
Total science and engineering	2,892	2,942	3,104	3,468	3,913	4,607	4,864
Engineering	186	166	193	230	214	270	265
Sciences	2,706	2,776	2,911	3,238	3,699	4,337	4,599
Natural sciences	1,557	1,457	1,418	1,412	1,627	1,932	1,943
Physical science [1]	190	160	169	195	231	240	224
Mathematical science	212	202	173	205	270	267	268
Computer science	685	588	522	415	416	543	523
Biological science	450	487	533	561	668	838	863
Agricultural science	20	20	21	36	42	44	65
Social sciences	1,149	1,319	1,493	1,826	2,072	2,405	2,656
Social science	796	896	994	1,166	1,333	1,518	1,641
Psychology	353	423	499	660	739	887	1,015
Non-S&E [2]	7,121	7,001	7,175	8,065	8,709	9,375	10,105
Grand total	10,013	9,943	10,279	11,533	12,622	13,982	14,969

See explanatory information and SOURCES at end of table.

Appendix table 3-27. Earned bachelor's degrees conferred by all schools and by historically black colleges and universities (HBCUs) to black women, by field: 1987-1994, selected years

Field	1987	1989	1990	1991	1992	1993	1994
	Percentage from HBCUs						
Total science and engineering	31.0	30.3	29.8	30.1	30.0	32.2	31.4
Engineering	26.2	24.8	29.4	30.9	28.6	33.2	30.3
Sciences	31.3	30.7	29.9	30.0	30.1	32.1	31.5
Natural sciences	43.4	44.5	42.9	42.8	44.1	47.1	44.0
Physical science [1]	48.7	48.2	47.2	53.9	53.1	51.5	49.0
Mathematical science	48.7	48.3	45.8	47.6	50.9	51.2	50.1
Computer science	44.6	47.0	44.5	40.4	41.7	46.6	42.3
Biological science	38.6	40.0	39.9	39.6	40.8	45.2	42.0
Agricultural science	35.1	36.4	34.4	58.1	45.2	47.3	49.6
Social sciences	22.8	22.9	23.2	24.4	24.0	25.6	26.1
Social science	24.4	24.5	24.4	24.9	24.6	25.8	26.5
Psychology	19.7	20.2	21.2	23.5	23.1	25.2	25.3
Non-S&E [2]	29.9	27.8	27.3	27.6	27.4	27.6	27.5
Grand total	30.2	28.5	28.0	28.3	28.2	29.0	28.7

[1] In this table, "Physical science" includes earth, atmospheric, and ocean sciences, as well as physics, astronomy, and chemistry.

[2] Non-S&E refers to non-science and non-engineering.

NOTES: Data on race/ethnicity were collected biennially from 1977 through 1989 and annually thereafter. Data on race/ethnicity of degree recipients are collected on broad fields of study only; therefore, these data could not be adjusted to the exact field taxonomies used by NSF. Racial/ethnic categories are as designated on the survey form. These categories include U.S. citizens and foreign citizens on permanent visas (i.e., resident aliens who have been admitted for permanent residency).

SOURCE: Tabulations by National Science Foundation/SRS; data from National Center for Education Statistics IPEDS Completions Surveys, 1987-1994.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 3-28. Earned bachelor's degrees conferred by all schools and by institutions in Puerto Rico to Hispanics, by field: 1987-1994, selected years

Page 1 of 2

Field	1987	1989	1990	1991	1992	1993	1994
	Total, all Hispanic recipients						
Total science and engineering	12,419	13,327	13,918	15,351	17,391	18,442	20,529
Engineering	2,554	2,561	2,511	2,566	2,733	2,961	3,143
Sciences	9,865	10,766	11,407	12,785	14,658	15,481	17,386
Natural sciences	4,660	4,417	4,357	4,705	4,892	5,034	5,648
Physical science [1]	585	563	522	533	546	599	733
Mathematical science	321	373	413	480	482	470	543
Computer science	1,375	1,195	1,085	1,215	1,173	1,096	1,135
Biological science	2,146	2,090	2,119	2,264	2,477	2,652	2,901
Agricultural science	233	196	218	213	214	217	336
Social sciences	5,205	6,349	7,050	8,080	9,766	10,447	11,738
Social science	3,503	4,197	4,645	5,334	6,519	6,860	7,748
Psychology	1,702	2,152	2,405	2,746	3,247	3,587	3,990
Non-S&E [2]	25,777	28,034	29,946	33,676	35,616	39,403	42,154
Grand total	38,196	41,361	43,864	49,027	53,007	57,845	62,683
	Total, all Hispanic recipients from institutions in Puerto Rico						
Total science and engineering	3,065	3,056	2,983	2,952	3,007	3,001	3,205
Engineering	584	651	626	554	686	697	742
Sciences	2,481	2,405	2,357	2,398	2,321	2,304	2,463
Natural sciences	1,556	1,479	1,447	1,446	1,339	1,300	1,374
Physical science [1]	173	184	184	154	172	172	227
Mathematical science	58	69	69	108	34	41	27
Computer science	337	326	261	327	296	254	258
Biological science	916	858	862	797	837	833	808
Agricultural science	72	42	71	60	0	0	54
Social sciences	925	926	910	952	982	1,004	1,089
Social science	576	501	495	523	496	508	590
Psychology	349	425	415	429	486	496	499
Non-S&E [2]	8,871	9,146	9,192	9,558	9,748	10,358	10,249
Grand total	11,936	12,202	12,175	12,510	12,755	13,359	13,454

See explanatory information and SOURCES at end of table.

Appendix table 3-28. Earned bachelor's degrees conferred by all schools and by institutions in Puerto Rico to Hispanics, by field: 1987-1994, selected years

Field	1987	1989	1990	1991	1992	1993	1994
	Percentage from institutions in Puerto Rico						
Total science and engineering	24.7	22.9	21.4	19.2	17.3	16.3	15.6
Engineering	22.9	25.4	24.9	21.6	25.1	23.5	23.6
Sciences	25.1	22.3	20.7	18.8	15.8	14.9	14.2
Natural sciences	33.4	33.5	33.2	30.7	27.4	25.8	24.3
Physical science [1]	29.6	32.7	35.2	28.9	31.5	28.7	31.0
Mathematical science	18.1	18.5	16.7	22.5	7.1	8.7	5.0
Computer science	24.5	27.3	24.1	26.9	25.2	23.2	22.7
Biological science	42.7	41.1	40.7	35.2	33.8	31.4	27.9
Agricultural science	30.9	21.4	32.6	28.2	0.0	0.0	16.1
Social sciences	17.8	14.6	12.9	11.8	10.1	9.6	9.3
Social science	16.4	11.9	10.7	9.8	7.6	7.4	7.6
Psychology	20.5	19.7	17.3	15.6	15.0	13.8	12.5
Non-S&E [2]	34.4	32.6	30.7	28.4	27.4	26.3	24.3
Grand total	31.2	29.5	27.8	25.5	24.1	23.1	21.5

[1] In this table, "Physical science" includes earth, atmospheric, and ocean sciences, as well as physics, astronomy, and chemistry.

[2] Non-S&E refers to non-science and non-engineering.

NOTES: Data on race/ethnicity were collected biennially from 1977 through 1989 and annually thereafter. Data on race/ethnicity of degree recipients are collected on broad fields of study only; therefore, these data could not be adjusted to the exact field taxonomies used by NSF. Racial/ethnic categories are as designated on the survey form. These categories include U.S. citizens and foreign citizens on permanent visas (i.e., resident aliens who have been admitted for permanent residency).

SOURCE: Tabulations by National Science Foundation/SRS; data from National Center for Education Statistics IPEDS Completions Surveys, 1987-1994.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 3-29. Earned bachelor's degrees conferred by all schools and by institutions in Puerto Rico to Hispanic men, by field: 1987-1994, selected years

Page 1 of 2

Field	1987	1989	1990	1991	1992	1993	1994
	Total, all Hispanic recipients						
Total science and engineering	6,974	7,318	7,434	7,888	8,730	9,160	10,190
Engineering	2,100	2,100	2,035	2,039	2,187	2,355	2,495
Sciences	4,874	5,218	5,399	5,849	6,543	6,805	7,695
Natural sciences	2,516	2,432	2,328	2,458	2,497	2,608	2,925
Physical science [1]	377	362	311	318	326	361	415
Mathematical science	196	224	249	259	279	273	300
Computer science	766	750	669	738	724	700	719
Biological science	1,018	965	955	1,019	1,043	1,144	1,298
Agricultural science	159	131	144	124	125	130	193
Social sciences	2,358	2,786	3,071	3,391	4,046	4,197	4,770
Social science	1,845	2,153	2,384	2,634	3,220	3,269	3,774
Psychology	513	633	687	757	826	928	996
Non-S&E [2]	9,664	10,684	11,249	12,893	13,296	14,665	15,670
Grand total	16,638	18,002	18,683	20,781	22,026	23,825	25,860
	Hispanic recipients from institutions in Puerto Rico						
Total science and engineering	1,524	1,559	1,462	1,365	1,362	1,339	1,426
Engineering	453	525	481	398	498	511	534
Sciences	1,071	1,034	981	967	864	828	892
Natural sciences	730	671	626	612	520	496	540
Physical science [1]	98	91	90	70	78	70	86
Mathematical science	30	39	47	50	20	24	15
Computer science	172	197	143	170	159	147	149
Biological science	377	322	302	293	263	255	258
Agricultural science	53	22	44	29	0	0	32
Social sciences	341	363	355	355	344	332	352
Social science	272	257	252	245	243	211	248
Psychology	69	106	103	110	101	121	104
Non-S&E [2]	2,578	2,814	2,804	3,204	2,890	3,030	3,087
Grand total	4,102	4,373	4,266	4,569	4,252	4,369	4,513

See explanatory information and SOURCES at end of table.

Appendix table 3-29. Earned bachelor's degrees conferred by all schools and by institutions in Puerto Rico to Hispanic men, by field: 1987-1994, selected years

Page 2 of 2

Field	1987	1989	1990	1991	1992	1993	1994
	Percentage from institutions in Puerto Rico						
Total science and engineering	21.9	21.3	19.7	17.3	15.6	14.6	14.0
Engineering	21.6	25.0	23.6	19.5	22.8	21.7	21.4
Sciences	22.0	19.8	18.2	16.5	13.2	12.2	11.6
Natural sciences	29.0	27.6	26.9	24.9	20.8	19.0	18.5
Physical science [1]	26.0	25.1	28.9	22.0	23.9	19.4	20.7
Mathematical science	15.3	17.4	18.9	19.3	7.2	8.8	5.0
Computer science	22.5	26.3	21.4	23.0	22.0	21.0	20.7
Biological science	37.0	33.4	31.6	28.8	25.2	22.3	19.9
Agricultural science	33.3	16.8	30.6	23.4	0.0	0.0	16.6
Social sciences	14.5	13.0	11.6	10.5	8.5	7.9	7.4
Social science	14.7	11.9	10.6	9.3	7.5	6.5	6.6
Psychology	13.5	16.7	15.0	14.5	12.2	13.0	10.4
Non-S&E [2]	26.7	26.3	24.9	24.9	21.7	20.7	19.7
Grand total	24.7	24.3	22.8	22.0	19.3	18.3	17.5

[1] In this table, "Physical science" includes earth, atmospheric, and ocean sciences, as well as physics, astronomy, and chemistry.

[2] Non-S&E refers to non-science and non-engineering.

NOTES: Data on race/ethnicity were collected biennially from 1977 through 1989 and annually thereafter. Data on race/ethnicity of degree recipients are collected on broad fields of study only; therefore, these data could not be adjusted to the exact field taxonomies used by NSF. Racial/ethnic categories are as designated on the survey form. These categories include U.S. citizens and foreign citizens on permanent visas (i.e., resident aliens who have been admitted for permanent residency).

SOURCE: Tabulations by National Science Foundation/SRS; data from National Center for Education Statistics IPEDS Completions Surveys, 1987-1994.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 3-30. Earned bachelor's degrees conferred by all schools and by institutions in Puerto Rico to Hispanic women, by field: 1987-1994, selected years

Page 1 of 2

Field	1987	1989	1990	1991	1992	1993	1994
	Total, all Hispanic recipients						
Total science and engineering	5,445	6,009	6,484	7,463	8,661	9,282	10,339
Engineering	454	461	476	527	546	606	648
Sciences	4,991	5,548	6,008	6,936	8,115	8,676	9,691
Natural sciences	2,144	1,985	2,029	2,247	2,395	2,426	2,723
Physical science [1]	208	201	211	215	220	238	318
Mathematical science	125	149	164	221	203	197	243
Computer science	609	445	416	477	449	396	416
Biological science	1,128	1,125	1,164	1,245	1,434	1,508	1,603
Agricultural science	74	65	74	89	89	87	143
Social sciences	2,847	3,563	3,979	4,689	5,720	6,250	6,968
Social science	1,658	2,044	2,261	2,700	3,299	3,591	3,974
Psychology	1,189	1,519	1,718	1,989	2,421	2,659	2,994
Non-S&E [2]	16,113	17,350	18,697	20,783	22,320	24,738	26,484
Grand total	21,558	23,359	25,181	28,246	30,981	34,020	36,823
	Hispanic recipients from institutions in Puerto Rico						
Total science and engineering	1,541	1,497	1,521	1,587	1,645	1,662	1,779
Engineering	131	126	145	156	188	186	208
Sciences	1,410	1,371	1,376	1,431	1,457	1,476	1,571
Natural sciences	826	808	821	834	819	804	834
Physical science [1]	75	93	94	84	94	102	141
Mathematical science	28	30	22	58	14	17	12
Computer science	165	129	118	157	137	107	109
Biological science	539	536	560	504	574	578	550
Agricultural science	19	20	27	31	0	0	22
Social sciences	584	563	555	597	638	672	737
Social science	304	244	243	278	253	297	342
Psychology	280	319	312	319	385	375	395
Non-S&E [2]	6,293	6,332	6,388	6,354	6,858	7,328	7,162
Grand total	7,834	7,829	7,909	7,941	8,503	8,990	8,941

See explanatory information and SOURCES at end of table.

Appendix table 3-30. Earned bachelor's degrees conferred by all schools and by institutions in Puerto Rico to Hispanic women, by field: 1987-1994, selected years

Page 2 of 2

Field	1987	1989	1990	1991	1992	1993	1994
	Percentage from institutions in Puerto Rico						
Total science and engineering	28.3	24.9	23.5	21.3	19.0	17.9	17.2
Engineering	28.9	27.3	30.5	29.6	34.4	30.7	32.1
Sciences	28.3	24.7	22.9	20.6	18.0	17.0	16.2
Natural sciences	38.5	40.7	40.5	37.1	34.2	33.1	30.6
Physical science [1]	36.1	46.3	44.5	39.1	42.7	42.9	44.3
Mathematical science	22.4	20.1	13.4	26.2	6.9	8.6	4.9
Computer science	27.1	29.0	28.4	32.9	30.5	27.0	26.2
Biological science	47.8	47.6	48.1	40.5	40.0	38.3	34.3
Agricultural science	25.7	30.8	36.5	34.8	0.0	0.0	15.4
Social sciences	20.5	15.8	13.9	12.7	11.2	10.8	10.6
Social science	18.3	11.9	10.7	10.3	7.7	8.3	8.6
Psychology	23.5	21.0	18.2	16.0	15.9	14.1	13.2
Non-S&E [2]	39.1	36.5	34.2	30.6	30.7	29.6	27.0
Grand total	36.3	33.5	31.4	28.1	27.4	26.4	24.3

[1] In this table, "Physical science" includes earth, atmospheric, and ocean sciences, as well as physics, astronomy, and chemistry.

[2] Non-S&E refers to non-science and non-engineering.

NOTES: Data on race/ethnicity were collected biennially from 1977 through 1989 and annually thereafter. Data on race/ethnicity of degree recipients are collected on broad fields of study only; therefore, these data could not be adjusted to the exact field taxonomies used by NSF. Racial/ethnic categories are as designated on the survey form. These categories include U.S. citizens and foreign citizens on permanent visas (i.e., resident aliens who have been admitted for permanent residency).

SOURCE: Tabulations by National Science Foundation/SRS; data from National Center for Education Statistics IPEDS Completions Surveys, 1987-1994.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 4-1. Graduate student enrollment in science and engineering, by field: 1985-1995

Page 1 of 1

Academic discipline	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	Percent change 1985-1995	Percent change 1993-1995
Total science and engineering	358,126	368,119	373,355	375,287	382,769	397,159	412,708	430,797	436,233	431,758	423,922	18.37	-2.82
Total sciences	262,135	266,245	269,402	272,458	278,726	289,534	299,132	312,762	319,352	318,698	316,393	20.70	-0.93
Physical sciences	30,981	32,246	32,727	32,962	33,616	34,075	34,710	35,348	35,318	34,449	33,470	8.03	-5.23
Astronomy	671	689	719	731	789	810	829	869	880	973	912	35.92	3.64
Chemistry	18,305	18,744	18,827	18,579	18,828	19,118	19,407	19,929	20,131	19,797	19,645	7.32	-2.41
Physics	11,672	12,437	12,807	13,308	13,657	13,813	14,081	14,122	13,841	13,162	12,427	6.47	-10.22
Other physical sciences	333	376	374	344	342	334	393	428	466	517	486	45.95	4.29
Earth, atmospheric, and ocean sciences	15,420	15,066	14,371	13,867	13,643	13,984	14,480	15,347	15,805	16,042	15,802	2.48	-0.02
Atmospheric sciences	964	961	952	940	912	929	968	1,089	1,112	1,109	1,072	11.20	-3.60
Earth sciences	10,294	9,819	8,998	8,463	8,052	7,692	7,567	7,744	7,785	7,741	7,602	-26.15	-2.35
Oceanography	2,081	2,128	2,127	2,033	2,207	2,333	2,386	2,530	2,611	2,853	2,703	29.89	3.52
Other geosciences	2,081	2,158	2,294	2,431	2,472	3,030	3,559	3,984	4,297	4,339	4,425	112.64	2.98
Mathematics and statistics	17,563	17,949	18,508	19,077	19,247	19,774	19,952	20,355	20,000	19,579	18,509	5.39	-7.46
Computer science	29,769	31,349	32,051	32,227	32,482	34,257	34,610	36,320	36,298	34,278	33,509	12.56	-7.68
Agricultural sciences	11,561	11,458	11,118	11,135	11,190	11,316	11,506	11,827	11,914	12,199	12,426	7.48	4.30
Biological sciences	46,112	46,765	46,747	47,565	48,852	49,989	51,778	54,177	56,452	58,143	58,753	27.41	4.08
Psychology	40,721	41,241	42,612	43,963	45,528	48,168	51,343	53,599	54,680	54,726	54,243	33.21	-0.80
Social sciences	70,008	70,171	71,268	71,662	74,168	77,971	80,753	85,789	88,885	89,282	89,681	28.10	0.90
Economics	14,698	14,351	14,201	14,295	14,415	14,599	15,071	15,774	15,629	15,267	15,111	2.81	-3.31
Political science and public administration	26,621	27,091	27,429	27,723	29,194	30,582	31,707	33,797	35,151	34,383	34,374	29.12	-2.21
Sociology	7,620	7,553	7,968	8,077	8,393	8,965	9,292	9,990	10,360	10,485	10,516	38.01	1.51
Anthropology	5,631	5,805	5,835	5,945	6,128	6,479	6,731	7,123	7,361	7,665	7,694	36.64	4.52
Linguistics	3,055	3,109	3,282	3,243	3,286	3,404	3,425	3,277	3,321	3,279	3,194	4.55	-3.82
History of science	272	266	294	288	304	331	337	360	369	387	401	47.43	8.67
Other social sciences	12,111	11,996	12,259	12,091	12,448	13,611	14,190	15,468	16,694	17,816	18,391	51.85	10.17
Engineering	95,991	101,874	103,953	102,829	104,043	107,625	113,576	118,035	116,881	113,060	107,529	12.02	-8.00
Aerospace engineering	2,538	2,804	3,015	3,223	3,524	3,934	4,120	4,036	3,940	3,715	3,343	31.72	-15.15
Chemical engineering	7,150	7,012	7,111	6,618	6,460	6,735	7,127	7,397	7,516	7,608	7,432	3.94	-1.12
Civil engineering	14,902	14,976	14,682	14,811	14,909	15,542	17,398	19,572	19,583	19,925	19,218	28.96	-1.86
Electrical engineering	28,203	29,969	31,399	32,035	33,257	33,722	35,182	36,460	35,337	33,052	31,060	10.13	-12.10
Mechanical engineering	14,157	15,713	16,366	16,151	16,265	16,879	17,730	18,637	18,477	17,761	16,360	15.56	-11.46
Materials engineering	3,943	4,208	4,366	4,337	4,594	4,941	5,160	5,512	5,363	5,191	4,920	24.78	-8.26
Industrial engineering	10,499	11,529	12,220	11,393	11,094	11,248	12,676	13,525	13,596	13,696	13,182	25.55	-3.05
Other engineering	14,599	15,663	14,794	14,261	13,940	14,624	14,183	12,896	13,069	12,112	12,014	-17.71	-8.07

SOURCE: National Science Foundation/SRS. Survey of Graduate Students and Postdoctorates in Science and Engineering.

Appendix table 4-2. Female graduate student enrollment in science and engineering, by field: 1985-1995

Page 1 of 1

Academic Discipline	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	Percent change 1985-1995	Percent change 1993-1995	Percent proportion 1995	Percent proportion 1985
Total science and engineering	110,662	114,423	117,197	121,276	125,908	133,752	140,855	150,332	156,757	159,338	160,864	45.4	2.6	100.0	100
Total sciences	99,582	102,058	104,234	108,152	112,308	119,080	125,140	133,099	139,065	141,284	142,712	43.3	2.6	88.7	90.0
Physical sciences	6,507	6,862	7,114	7,497	7,801	8,068	8,564	8,844	9,202	9,159	9,111	40.0	-1.0	5.7	5.9
Astronomy	108	121	118	140	140	165	172	186	198	223	223	106.5	12.6	0.1	0.1
Chemistry	4,789	5,026	5,178	5,467	5,670	5,868	6,262	6,562	6,852	6,841	6,856	43.2	0.1	4.3	4.3
Physics	1,497	1,576	1,673	1,751	1,868	1,913	1,980	1,943	1,976	1,908	1,835	22.6	-7.1	1.1	1.4
Other physical sciences	113	139	145	139	123	122	150	153	176	187	197	74.3	11.9	0.1	0.1
Earth, atmospheric, and ocean sciences	3,927	3,947	3,779	3,805	3,858	4,119	4,455	4,858	5,060	5,353	5,479	39.5	8.3	3.4	3.5
Atmospheric sciences	157	179	168	163	178	185	190	241	225	242	237	51.0	5.3	0.1	0.1
Earth sciences	2,484	2,356	2,164	2,095	1,963	1,922	2,008	2,077	2,110	2,235	2,302	-7.3	9.1	1.4	2.2
Oceanography	610	667	634	645	725	781	846	959	1,004	1,107	1,099	80.2	9.5	0.7	0.6
Other geosciences	676	745	813	902	992	1,231	1,411	1,581	1,721	1,769	1,841	172.3	7.0	1.1	0.6
Mathematics and statistics	5,354	5,479	5,596	5,776	5,985	6,199	6,298	6,549	6,638	6,535	6,261	16.9	-5.7	3.9	4.8
Computer science	7,561	7,852	8,015	8,194	7,988	8,199	8,270	8,467	8,472	8,152	8,175	8.1	-3.5	5.1	6.8
Agricultural sciences	2,991	2,953	2,952	3,097	3,145	3,335	3,567	3,768	4,088	4,288	4,451	48.8	8.9	2.8	2.7
Biological sciences	19,904	20,471	20,433	21,261	22,234	23,042	24,135	25,475	27,053	28,155	28,819	44.8	6.5	17.9	18.0
Psychology	25,124	25,864	26,929	28,461	29,855	32,346	34,787	36,904	38,068	38,240	38,142	51.8	0.2	23.7	22.7
Social sciences	28,214	28,630	29,416	30,061	31,442	33,772	35,064	38,234	40,484	41,402	42,274	49.8	4.4	26.3	25.5
Economics	3,564	3,509	3,518	3,645	3,824	3,973	4,195	4,514	4,606	4,549	4,680	31.3	1.6	2.9	3.2
Political science and public administration	10,345	10,677	10,866	11,393	12,170	13,157	13,736	14,971	15,784	15,605	15,979	54.5	1.2	9.9	9.3
Sociology	4,037	4,099	4,352	4,387	4,565	4,960	5,101	5,684	6,080	6,331	6,341	57.1	4.3	3.9	3.6
Anthropology	3,121	3,345	3,353	3,446	3,580	3,791	3,953	4,247	4,392	4,593	4,556	46.0	3.7	2.8	2.8
Linguistics	1,857	1,857	1,977	1,947	1,952	2,006	1,913	1,996	2,020	2,066	2,000	7.7	-1.0	1.2	1.7
History of science	92	97	96	104	112	118	132	130	142	140	139	51.1	-2.1	0.1	0.1
Other social sciences	5,198	5,046	5,254	5,139	5,239	5,767	6,034	6,692	7,460	8,118	8,579	65.0	15.0	5.3	4.7
Engineering	11,080	12,365	12,963	13,124	13,600	14,672	15,715	17,233	17,692	18,054	18,152	63.8	2.6	11.3	10.0
Aerospace engineering	163	200	224	227	243	289	327	348	357	358	351	115.3	-1.7	0.2	0.1
Chemical engineering	1,004	1,039	1,154	1,075	1,029	1,146	1,257	1,394	1,499	1,526	1,558	55.2	3.9	1.0	0.9
Civil engineering	2,147	2,147	2,103	2,294	2,435	2,689	3,102	3,654	3,858	4,211	4,232	97.1	9.7	2.6	1.9
Electrical engineering	2,435	2,908	3,098	3,278	3,515	3,715	3,871	4,293	4,322	4,104	4,202	72.6	-2.8	2.6	2.2
Mechanical engineering	1,011	1,159	1,296	1,402	1,398	1,442	1,511	1,698	1,774	1,823	1,670	65.2	-5.9	1.0	0.9
Materials engineering	603	675	729	756	810	893	987	1,069	1,027	1,069	1,059	75.6	3.1	0.7	0.5
Industrial engineering	1,780	2,095	2,244	2,093	2,110	2,137	2,355	2,655	2,593	2,800	2,795	57.0	7.8	1.7	1.6
Other engineering	1,937	2,142	2,115	1,999	2,060	2,361	2,305	2,122	2,262	2,163	2,285	18.0	1.0	1.4	1.8

NOTE: Because of rounding, details may not add to totals.

SOURCE: National Science Foundation/SRS. Survey of Graduate Students and Postdoctorates in Science and Engineering.

Appendix table 4-3. Male graduate student enrollment in science and engineering, by field: 1985-1995

Page 1 of 1

Academic discipline	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	Percent change 1985-1995	Percent change 1993-1995	Percent proportion 1995	Percent proportion 1985
Total science and engineering	247,464	253,696	256,158	254,011	256,861	263,407	271,853	280,465	279,476	272,420	263,058	6.3	-5.9	100.0	100.0
Total sciences	162,553	164,187	165,168	164,306	166,418	170,454	173,992	179,663	180,287	177,414	173,681	6.8	-3.7	66.0	65.7
Physical sciences	24,474	25,384	25,613	25,465	25,815	26,007	26,146	26,504	26,116	25,290	24,359	-0.5	-6.7	9.3	9.9
Astronomy	563	568	601	591	649	645	657	683	682	750	689	22.4	1.0	0.3	0.2
Chemistry	13,516	13,718	13,649	13,112	13,158	13,250	13,145	13,367	13,279	12,956	12,789	-5.4	-3.7	4.9	5.5
Physics	10,175	10,861	11,134	11,557	11,789	11,900	12,101	12,179	11,865	11,254	10,592	4.1	-10.7	4.0	4.1
Other physical sciences	220	237	229	205	219	212	243	275	290	330	289	31.4	-0.3	0.1	0.1
Earth, atmospheric, and ocean sciences	11,493	11,119	10,592	10,062	9,785	9,865	10,025	10,489	10,745	10,689	10,323	-10.2	-3.9	3.9	4.6
Atmospheric sciences	807	782	784	777	734	744	778	848	887	867	835	3.5	-5.9	0.3	0.3
Earth sciences	7,810	7,463	6,834	6,368	6,089	5,770	5,559	5,667	5,675	5,506	5,300	-32.1	-6.6	2.0	3.2
Oceanography	1,471	1,461	1,493	1,388	1,482	1,552	1,540	1,571	1,607	1,746	1,604	9.0	-0.2	0.6	0.6
Other geosciences	1,405	1,413	1,481	1,529	1,480	1,799	2,148	2,403	2,576	2,570	2,584	83.9	0.3	1.0	0.6
Mathematics and statistics	12,209	12,470	12,912	13,301	13,262	13,575	13,654	13,806	13,362	13,044	12,248	0.3	-8.3	4.7	4.9
Computer science	22,208	23,497	24,036	24,033	24,494	26,058	26,340	27,853	27,826	26,126	25,334	14.1	-9.0	9.6	9.0
Agricultural sciences	8,570	8,505	8,166	8,038	8,045	7,981	7,939	8,059	7,826	7,911	7,975	-6.9	1.9	3.0	3.5
Biological sciences	26,208	26,294	26,314	26,304	26,618	26,947	27,643	28,702	29,399	29,988	29,934	14.2	1.8	11.4	10.6
Psychology	15,597	15,377	15,683	15,502	15,673	15,822	16,556	16,695	16,612	16,486	16,101	3.2	-3.1	6.1	6.3
Social sciences	41,794	41,541	41,852	41,601	42,726	44,199	45,689	47,555	48,401	47,880	47,407	13.4	-2.1	18.0	16.9
Economics	11,134	10,842	10,683	10,650	10,591	10,626	10,876	11,260	11,023	10,718	10,431	-6.3	-5.4	4.0	4.5
Political science and public administration	16,276	16,414	16,563	16,330	17,024	17,425	17,971	18,826	19,367	18,778	18,395	13.0	-5.0	7.0	6.6
Sociology	3,583	3,454	3,616	3,690	3,828	4,005	4,191	4,306	4,280	4,154	4,175	16.5	-2.5	1.6	1.4
Anthropology	2,510	2,460	2,482	2,499	2,548	2,688	2,778	2,876	2,969	3,072	3,138	25.0	5.7	1.2	1.0
Linguistics	1,198	1,252	1,305	1,296	1,334	1,398	1,512	1,281	1,301	1,213	1,194	-0.3	-8.2	0.5	0.5
History of science	180	169	198	184	192	213	205	230	227	247	262	45.6	15.4	0.1	0.1
Other social sciences	6,913	6,950	7,005	6,952	7,209	7,844	8,156	8,776	9,234	9,698	9,812	41.9	6.3	3.7	2.8
Engineering	84,911	89,509	90,990	89,705	90,443	92,953	97,861	100,802	99,189	95,006	89,377	5.3	-9.9	34.0	34.3
Aerospace engineering	2,375	2,604	2,791	2,996	3,281	3,645	3,793	3,688	3,583	3,357	2,992	26.0	-16.5	1.1	1.0
Chemical engineering	6,146	5,973	5,957	5,543	5,431	5,589	5,870	6,003	6,017	6,082	5,874	-4.4	-2.4	2.2	2.5
Civil engineering	12,755	12,829	12,579	12,517	12,474	12,853	14,296	15,918	15,725	15,714	14,986	17.5	-4.7	5.7	5.2
Electrical engineering	25,768	27,061	28,301	28,757	29,742	30,007	31,311	32,167	31,015	28,948	26,858	4.2	-13.4	10.2	10.4
Mechanical engineering	13,146	14,554	15,070	14,749	14,867	15,437	16,219	16,939	16,703	15,938	14,690	11.7	-12.1	5.6	5.3
Materials engineering	3,340	3,533	3,637	3,581	3,784	4,048	4,173	4,443	4,336	4,122	3,861	15.6	-11.0	1.5	1.3
Industrial engineering	8,719	9,434	9,976	9,300	8,984	9,111	10,321	10,870	11,003	10,896	10,387	19.1	-5.6	3.9	3.5
Other engineering	12,662	13,521	12,679	12,262	11,880	12,263	11,878	10,774	10,807	9,949	9,729	-23.2	-10.0	3.7	5.1

NOTE: Because of rounding, details may not add to totals.

SOURCE: National Science Foundation/SRS. Survey of Graduate Students and Postdoctorates in Science and Engineering.

Appendix table 4-4. Full-time graduate student enrollment in science and engineering, by field: 1985-1995

Page 1 of 1

Academic discipline	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	Percent change 1985-1995	Percent change 1993-1995	Percent proportion 1985	Percent proportion 1995
Total science and engineering	234,056	242,841	247,219	250,667	256,928	265,423	277,183	290,654	294,227	293,324	288,016	23.1	-2.1	100.0	100.0
Total sciences	178,160	182,675	185,287	187,660	192,553	199,446	206,149	216,228	220,400	221,756	220,154	23.6	-0.1	76.1	76.4
Physical sciences	26,669	27,762	28,412	28,574	29,207	29,485	30,117	30,673	30,611	30,043	28,892	8.3	-5.6	11.4	10.0
Earth, atmospheric, and ocean sciences	11,334	11,249	10,435	10,192	10,021	10,244	10,373	10,986	11,367	11,470	11,290	-0.4	-0.7	4.8	3.9
Mathematics and statistics	11,816	12,388	13,043	13,512	13,681	13,865	14,256	14,679	14,530	14,226	13,422	13.6	-7.6	5.0	4.7
Computer science	13,861	15,020	15,336	15,133	15,606	16,689	16,516	17,506	17,399	16,712	16,564	19.5	-4.8	5.9	5.8
Agricultural sciences	9,250	9,341	9,094	9,122	9,070	9,100	9,289	9,452	9,468	9,492	9,630	4.1	1.7	4.0	3.3
Biological sciences	37,001	37,810	38,235	39,209	40,348	40,945	42,700	44,389	46,481	48,017	48,283	30.5	3.9	15.8	16.8
Psychology	25,335	26,255	27,256	28,118	29,348	30,619	32,258	34,277	34,894	35,434	35,762	41.2	2.5	10.8	12.4
Social sciences	42,894	42,850	43,476	43,800	45,272	48,499	50,640	54,266	55,650	56,362	56,311	31.3	1.2	18.3	19.6
Engineering	55,896	60,166	61,932	63,007	64,375	65,977	71,034	74,426	73,827	71,568	67,862	21.4	-8.1	23.9	23.6
Aerospace engineering	1,994	2,154	2,372	2,533	2,772	3,010	3,325	3,306	3,262	3,000	2,693	35.1	-17.4	0.9	0.9
Chemical engineering	5,546	5,594	5,674	5,359	5,282	5,443	5,788	5,946	6,041	6,105	5,962	7.5	-1.3	2.4	2.1
Civil engineering	9,749	9,971	9,628	9,946	9,964	10,128	11,328	12,454	12,458	12,641	12,248	25.6	-1.7	4.2	4.3
Electrical engineering	14,799	16,290	17,101	17,706	18,466	18,675	19,904	20,996	20,400	19,414	18,303	23.7	-10.3	6.3	6.4
Mechanical engineering	8,875	9,789	10,230	10,416	10,492	10,867	11,687	12,383	12,395	11,875	11,119	25.3	-10.3	1.5	3.9
Materials engineering	3,093	3,370	3,436	3,466	3,720	3,930	4,058	4,274	4,249	4,108	3,880	25.4	-8.7	3.8	1.3
Industrial engineering	3,456	3,807	4,156	4,295	4,658	4,770	5,598	6,081	5,902	5,910	5,328	54.2	-9.7	1.3	1.8
Other engineering	8,384	9,191	9,335	9,286	9,021	9,154	9,346	8,986	9,120	8,515	8,329	-0.7	-8.7	3.6	2.9

NOTE: Because of rounding, details may not add to totals.

SOURCE: National Science Foundation/SRS. Survey of Graduate Students and Postdoctorates in Science and Engineering.

Appendix table 4-5. Female full-time graduate student enrollment in science and engineering, by field: 1985-1995

Academic discipline	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	Percent change 1985-1995	Percent change 1993-1995	Percent proportion 1995
Total science and engineering	69,817	72,960	75,070	78,319	81,810	86,715	92,085	98,799	103,255	106,485	107,805	54.4	4.4	100.0
Total sciences	63,536	65,990	67,787	70,700	73,674	78,017	82,402	88,135	92,056	94,908	96,267	51.5	4.6	89.3
Physical sciences	5,428	5,740	6,028	6,366	6,660	6,821	7,272	7,500	7,723	7,766	7,660	41.1	-0.8	7.1
Earth, atmospheric, and ocean sciences	2,834	2,913	2,676	2,748	2,753	2,927	3,176	3,398	3,552	3,794	3,901	37.6	9.8	3.6
Mathematics and statistics	3,202	3,404	3,562	3,718	3,935	4,044	4,221	4,429	4,434	4,416	4,203	31.3	-5.2	3.9
Computer science	3,055	3,317	3,331	3,338	3,251	3,471	3,481	3,559	3,594	3,559	3,665	20.0	2.0	3.4
Agricultural sciences	2,397	2,386	2,378	2,482	2,513	2,646	2,865	2,998	3,187	3,326	3,456	44.2	8.4	3.2
Biological sciences	15,203	15,817	16,136	16,805	17,612	18,156	19,202	20,159	21,561	22,524	22,999	51.3	6.7	21.3
Psychology	15,103	15,992	16,834	17,919	18,881	19,977	21,301	23,061	23,665	24,247	24,646	63.2	4.1	22.9
Social sciences	16,314	16,421	16,842	17,324	18,069	19,975	20,884	23,031	24,340	25,276	25,737	57.8	5.7	23.9
Engineering	6,281	6,970	7,283	7,619	8,136	8,698	9,683	10,664	11,199	11,577	11,538	83.7	3.0	10.7
Aerospace engineering	126	148	167	168	180	199	254	263	291	278	276	119.0	-5.2	0.3
Chemical engineering	754	788	874	792	796	896	985	1,097	1,166	1,193	1,220	61.8	4.6	1.1
Civil engineering	1,492	1,487	1,398	1,565	1,649	1,781	2,019	2,328	2,524	2,786	2,817	88.8	11.6	2.6
Electrical engineering	1,208	1,467	1,549	1,682	1,822	1,956	2,165	2,426	2,444	2,391	2,468	104.3	1.0	2.3
Mechanical engineering	559	627	732	835	855	848	942	1,086	1,185	1,217	1,131	102.3	-4.6	1.0
Materials engineering	439	521	569	579	639	692	742	807	802	840	816	85.9	1.7	0.8
Industrial engineering	635	734	734	736	907	908	1,042	1,175	1,173	1,298	1,170	84.3	-0.3	1.1
Other engineering	1,068	1,198	1,260	1,262	1,288	1,418	1,534	1,482	1,614	1,574	1,640	53.6	1.6	1.5

SOURCE: National Science Foundation/SRS. Survey of Graduate Students and Postdoctorates in Science and Engineering.

Appendix table 4-6. Male full-time graduate student enrollment in science and engineering, by field: 1985-1995

Page 1 of 1

Academic discipline	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	Percent change 1985-1995	Percent change 1993-1995	Percent proportion 1995
Total science and engineering	164,239	169,881	172,149	172,348	175,118	178,708	185,098	191,855	190,972	186,839	180,211	9.7	-5.6	100.0
Total sciences	114,624	116,685	117,500	116,960	118,879	121,429	123,747	128,093	128,344	126,848	123,887	8.1	-3.5	68.7
Physical sciences	21,241	22,022	22,384	22,208	22,547	22,664	22,845	23,173	22,888	22,277	21,232	0.0	-7.2	11.8
Earth, atmospheric, and ocean sciences	8,500	8,336	7,759	7,444	7,268	7,317	7,197	7,588	7,815	7,676	7,389	-13.1	-5.5	4.1
Mathematics and statistics	8,614	8,984	9,481	9,794	9,746	9,821	10,035	10,250	10,096	9,810	9,219	7.0	-8.7	5.1
Computer science	10,806	11,703	12,005	11,795	12,355	13,218	13,035	13,947	13,805	13,153	12,899	19.4	-6.6	7.2
Agricultural sciences	6,853	6,955	6,716	6,640	6,557	6,454	6,424	6,454	6,281	6,166	6,174	-9.9	-1.7	3.4
Biological sciences	21,798	21,993	22,099	22,404	22,736	22,789	23,498	24,230	24,920	25,493	25,284	16.0	1.5	14.0
Psychology	10,232	10,263	10,422	10,199	10,467	10,642	10,957	11,216	11,229	11,187	11,116	8.6	-1.0	6.2
Social sciences	26,580	26,429	26,634	26,476	27,203	28,524	29,756	31,235	31,310	31,086	30,574	15.0	-2.4	17.0
Engineering	49,615	53,196	54,649	55,388	56,239	57,279	61,351	63,762	62,628	59,991	56,324	13.5	-10.1	31.3
Aerospace engineering	1,868	2,006	2,205	2,365	2,592	2,811	3,071	3,043	2,971	2,722	2,417	29.4	-18.6	1.3
Chemical engineering	4,792	4,806	4,800	4,567	4,486	4,547	4,803	4,849	4,875	4,912	4,742	-1.0	-2.7	2.6
Civil engineering	8,257	8,484	8,230	8,381	8,315	8,347	9,309	10,126	9,934	9,855	9,431	14.2	-5.1	5.2
Electrical engineering	13,591	14,823	15,552	16,024	16,644	16,719	17,739	18,570	17,956	17,023	15,835	16.5	-11.8	8.8
Mechanical engineering	8,316	9,162	9,498	9,581	9,637	10,019	10,745	11,297	11,210	10,658	9,988	20.1	-10.9	5.5
Materials engineering	2,654	2,849	2,867	2,887	3,081	3,238	3,316	3,467	3,447	3,268	3,064	15.4	-11.1	1.7
Industrial engineering	2,821	3,073	3,422	3,559	3,751	3,861	4,556	4,906	4,729	4,612	4,158	47.4	-12.1	2.3
Other engineering	7,316	7,993	8,075	8,024	7,733	7,736	7,812	7,504	7,506	6,941	6,689	-8.6	-10.9	3.7

SOURCE: National Science Foundation/SRS. Survey of Graduate Students and Postdoctorates in Science and Engineering.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 4-7. Part-time graduate student enrollment in science and engineering, by field: 1985-1995

Page 1 of 1

Academic discipline	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	Percent change 1985-1995	Percent change 1993-1995	Percent proportion 1985	Percent proportion 1995
Total science and engineering	124,070	125,278	126,136	124,620	125,841	131,736	135,525	140,143	142,006	138,434	135,906	9.5	-4.3	100.0	100.0
Total sciences	83,975	83,570	84,115	84,798	86,173	90,088	92,983	96,534	98,952	96,942	96,239	14.6	-2.7	67.7	70.8
Physical sciences	4,312	4,484	4,315	4,388	4,409	4,590	4,593	4,675	4,707	4,406	4,578	6.2	-2.7	3.5	3.4
Earth, atmospheric, and ocean sciences	4,086	3,817	3,936	3,675	3,622	3,740	4,107	4,361	4,438	4,572	4,512	10.4	1.7	3.3	3.3
Mathematics and statistics	5,747	5,561	5,465	5,565	5,566	5,909	5,696	5,676	5,470	5,353	5,087	-11.5	-7.0	4.6	3.7
Computer science	15,908	16,329	16,715	17,094	16,876	17,568	18,094	18,814	18,899	17,566	16,945	6.5	-10.3	12.8	12.5
Agricultural sciences	2,311	2,117	2,024	2,013	2,120	2,216	2,217	2,375	2,446	2,707	2,796	21.0	14.3	1.9	2.1
Biological sciences	9,111	8,955	8,512	8,356	8,504	9,044	9,078	9,788	9,971	10,126	10,470	14.9	5.0	7.3	7.7
Psychology	15,386	14,986	15,356	15,845	16,180	17,549	19,085	19,322	19,786	19,292	18,481	20.1	-6.6	12.4	13.6
Social sciences	27,114	27,321	27,792	27,862	28,896	29,472	30,113	31,523	33,235	32,920	33,370	23.1	0.4	21.9	24.6
Engineering	40,095	41,708	42,021	39,822	39,668	41,648	42,542	43,609	43,054	41,492	39,667	-1.1	-7.9	32.3	29.2
Aerospace engineering	544	650	643	690	752	924	795	730	678	715	650	19.5	-4.1	0.4	0.5
Chemical engineering	1,604	1,418	1,437	1,259	1,178	1,292	1,339	1,451	1,475	1,503	1,470	-8.4	-0.3	1.3	1.1
Civil engineering	5,153	5,005	5,054	4,885	4,945	5,414	6,070	7,118	7,125	7,284	6,970	35.3	-2.2	4.2	5.1
Electrical engineering	13,404	13,679	14,298	14,329	14,791	15,047	15,278	15,464	14,937	13,638	12,757	-4.8	-14.6	10.8	9.4
Mechanical engineering	5,282	5,924	6,136	5,735	5,773	6,012	6,043	6,254	6,082	5,886	5,241	-0.8	-13.8	4.3	3.9
Materials engineering	850	838	930	871	874	1,011	1,102	1,238	1,114	1,083	1,040	22.4	-6.6	0.7	0.8
Industrial engineering	7,043	7,722	8,064	7,098	6,436	6,478	7,078	7,444	7,694	7,786	7,854	11.5	2.1	5.7	5.8
Other engineering	6,215	6,472	5,459	4,975	4,919	5,470	4,837	3,910	3,949	3,597	3,685	-40.7	-6.7	5.0	2.7

SOURCE: National Science Foundation/SRS. Survey of Graduate Students and Postdoctorates in Science and Engineering.

Appendix table 4-8. Female part-time graduate student enrollment in science and engineering, by field: 1985-1995

Page 1 of 1

Academic discipline	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	Percent change		Percent proportion	
												1985-1995	1993-1995	1985	1995
Total science and engineering	40,845	41,463	42,127	42,957	44,098	47,037	48,770	51,533	53,502	52,853	53,059	29.9	-0.8	100.0	100.0
Total sciences	36,046	36,068	36,447	37,452	38,634	41,063	42,738	44,964	47,009	46,376	46,445	28.8	-1.2	88.3	87.5
Physical sciences	1,079	1,122	1,086	1,131	1,141	1,247	1,292	1,344	1,479	1,393	1,451	34.5	-1.9	2.6	2.7
Earth, atmospheric, and ocean sciences	1,093	1,034	1,103	1,057	1,105	1,192	1,279	1,460	1,508	1,559	1,578	44.4	4.6	2.7	3.0
Mathematics and statistics	2,152	2,075	2,034	2,058	2,050	2,155	2,077	2,120	2,204	2,119	2,058	-4.4	-6.6	5.3	3.9
Computer science	4,506	4,535	4,684	4,856	4,737	4,728	4,789	4,908	4,878	4,593	4,510	0.1	-7.5	11.0	8.5
Agricultural sciences	594	567	574	615	632	689	702	770	901	962	995	67.5	10.4	1.5	1.9
Biological sciences	4,701	4,654	4,297	4,456	4,622	4,886	4,933	5,316	5,492	5,631	5,820	23.8	6.0	11.5	11.0
Psychology	10,021	9,872	10,095	10,542	10,974	12,369	13,486	13,843	14,403	13,993	13,496	34.7	-6.3	24.5	25.4
Social sciences	11,900	12,209	12,574	12,737	13,373	13,797	14,180	15,203	16,144	16,126	16,537	39.0	2.4	29.1	31.2
Engineering	4,799	5,395	5,680	5,505	5,464	5,974	6,032	6,569	6,493	6,477	6,614	37.8	1.9	11.7	12.5
Aerospace engineering	37	52	57	59	63	90	73	85	66	80	75	102.7	13.6	0.1	0.1
Chemical engineering	250	251	280	283	233	250	272	297	333	333	338	35.2	1.5	0.6	0.6
Civil engineering	655	660	705	729	786	908	1,083	1,326	1,334	1,425	1,415	116.0	6.1	1.6	2.7
Electrical engineering	1,227	1,441	1,549	1,596	1,693	1,759	1,706	1,867	1,878	1,713	1,734	41.3	-7.7	3.0	3.3
Mechanical engineering	452	532	564	567	543	594	569	612	589	606	539	19.2	-8.5	1.1	1.0
Materials engineering	164	154	160	177	171	201	245	262	225	229	243	48.2	8.0	0.4	0.5
Industrial engineering	1,145	1,361	1,510	1,357	1,203	1,229	1,313	1,480	1,420	1,502	1,625	41.9	14.4	2.8	3.1
Other engineering	869	944	855	737	772	943	771	640	648	589	645	-25.8	-0.5	2.1	1.2

SOURCE: National Science Foundation/SRS. Survey of Graduate Students and Postdoctorates in Science and Engineering.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

272

273

Appendix table 4-9. Male part-time graduate student enrollment in science and engineering, by field: 1985-1995

Academic discipline	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	Percent change 1985-1995	Percent change 1993-1995	Percent proportion 1985	Percent proportion 1995
Total science and engineering	83,225	83,815	84,009	81,663	81,743	84,699	86,755	88,610	88,504	85,581	82,847	-0.5	-6.4	100.0	100.0
Total sciences	47,929	47,502	47,668	47,346	47,539	49,025	50,245	51,570	51,943	50,566	49,794	3.9	-4.1	57.6	60.1
Physical sciences	3,233	3,362	3,229	3,257	3,268	3,343	3,301	3,331	3,228	3,013	3,127	-3.3	-3.1	3.9	3.8
Earth, atmospheric, and ocean sciences	2,993	2,783	2,833	2,618	2,517	2,548	2,828	2,901	2,930	3,013	2,934	-2.0	0.1	3.6	3.5
Mathematics and statistics	3,595	3,486	3,431	3,507	3,516	3,754	3,619	3,556	3,266	3,234	3,029	-15.7	-7.3	4.3	3.7
Computer science	11,402	11,794	12,031	12,238	12,139	12,840	13,305	13,906	14,021	12,973	12,435	9.1	-11.3	13.7	15.0
Agricultural sciences	1,717	1,550	1,450	1,398	1,488	1,527	1,515	1,605	1,545	1,745	1,801	4.9	16.6	2.1	2.2
Biological sciences	4,410	4,301	4,215	3,900	3,882	4,158	4,145	4,472	4,479	4,495	4,650	5.4	3.8	5.3	5.6
Psychology	5,365	5,114	5,261	5,303	5,206	5,180	5,599	5,479	5,383	5,299	4,985	-7.1	-7.4	6.4	6.0
Social sciences	15,214	15,112	15,218	15,125	15,523	15,675	15,933	16,320	17,091	16,794	16,833	10.6	-1.5	18.3	20.3
Engineering	35,296	36,313	36,341	34,317	34,204	35,674	36,510	37,040	36,561	35,015	33,053	-6.4	-9.6	42.4	39.9
Aerospace engineering	507	598	586	631	689	834	722	645	612	635	575	13.4	-6.0	0.6	0.7
Chemical engineering	1,354	1,167	1,157	976	945	1,042	1,067	1,154	1,142	1,170	1,132	-16.4	-0.9	1.6	1.4
Civil engineering	4,498	4,345	4,349	4,136	4,159	4,506	4,987	5,792	5,791	5,859	5,555	23.5	-4.1	5.4	6.7
Electrical engineering	12,177	12,238	12,749	12,733	13,098	13,288	13,572	13,597	13,059	11,925	11,023	-9.5	-15.6	14.6	13.3
Mechanical engineering	4,830	5,392	5,572	5,168	5,230	5,418	5,474	5,642	5,493	5,280	4,702	-2.7	-14.4	5.8	5.7
Materials engineering	686	684	770	694	703	810	857	976	889	854	797	16.2	-10.3	0.8	1.0
Industrial engineering	5,898	6,361	6,554	5,741	5,233	5,249	5,765	5,964	6,274	6,284	6,229	5.6	-0.7	7.1	7.5
Other engineering	5,346	5,528	4,604	4,238	4,147	4,527	4,066	3,270	3,301	3,008	3,040	-43.1	-7.9	6.4	3.7

SOURCE: National Science Foundation/SRS. Survey of Graduate Students and Postdoctorates in Science and Engineering.

Appendix table 4-10. Full-time graduate students in science, engineering, and health in all institutions, by sex, source of major support, and field: 1995

Page 1 of 2

Source of major support	Total, all surveyed fields	Sciences: Sciences, total	Sciences: Physical sciences	Sciences: Earth, atmos-pheric, and ocean sciences	Sciences: Mathe-matical sciences	Sciences: Computer sciences	Sciences: Agri-cultural sciences	Sciences: Bio-logical sciences	Sciences: Psychol-ogy	Sciences: Social sciences
	Total									
Total, all sources	330,235	220,154	28,892	11,290	13,422	16,564	9,630	48,283	35,762	56,311
Federal, total	67,469	43,145	10,353	3,489	1,291	3,175	2,048	16,593	2,576	3,620
Dept. of Defense	9,421	4,232	1,197	421	322	1,443	32	357	175	285
Dept. of HHS, total	22,753	16,151	2,041	34	87	111	27	12,048	1,324	479
NIH	18,115	14,894	1,861	31	63	93	21	11,390	1,109	326
Other HHS	4,638	1,257	180	3	24	18	6	658	215	153
NSF	13,665	8,955	3,583	1,387	474	1,051	88	1,406	288	678
USDA	3,244	2,847	38	65	13	13	1,192	1,083	16	427
All other Federal	18,386	10,960	3,494	1,582	395	557	709	1,699	773	1,751
Institutional support	129,903	96,989	14,858	4,445	9,169	5,492	3,882	20,805	13,091	25,247
Other outside support, total	26,114	14,924	2,079	991	478	1,309	1,489	3,923	1,144	3,511
All other U.S.	20,564	11,549	1,792	756	291	1,065	1,090	3,317	1,101	2,137
Foreign	5,550	3,375	287	235	187	244	399	606	43	1,374
Self-support	106,749	65,096	1,602	2,365	2,484	6,588	2,211	6,962	18,951	23,933
	Men									
Total, all sources	191,695	123,887	21,232	7,389	9,219	12,899	6,174	25,284	11,116	30,574
Federal, total	42,860	26,880	7,842	2,377	975	2,629	1,312	8,887	890	1,968
Dept. of Defense	7,799	3,354	992	318	280	1,238	24	195	83	224
Dept. of HHS, total	10,803	8,567	1,328	23	67	86	18	6,417	445	183
NIH	9,601	7,937	1,196	21	50	76	15	6,088	379	112
Other HHS	1,202	630	132	2	17	10	3	329	66	71
NSF	9,958	6,174	2,770	928	331	858	54	751	114	368
USDA	2,019	1,703	31	44	10	10	754	591	5	258
All other Federal	12,281	7,082	2,721	1,064	287	437	462	933	243	935
Institutional support	78,667	56,013	10,709	2,822	6,347	4,314	2,498	11,034	4,518	13,771
Other outside support, total	17,942	9,373	1,539	708	340	1,028	1,048	2,161	388	2,161
All other U.S.	13,783	6,906	1,305	515	198	825	725	1,784	374	1,180
Foreign	4,159	2,467	234	193	142	203	323	377	14	981
Self-support	52,226	31,621	1,142	1,482	1,557	4,928	1,316	3,202	5,320	12,674
	Women									
Total, all sources	138,540	96,267	7,660	3,901	4,203	3,665	3,456	22,999	24,646	25,737
Federal, total	24,609	16,265	2,511	1,112	316	546	736	7,706	1,686	1,652
Dept. of Defense	1,622	878	205	103	42	205	8	162	92	61
Dept. of HHS, total	11,950	7,584	713	11	20	25	9	5,631	879	296
NIH	8,514	6,957	665	10	13	17	6	5,302	730	214
Other HHS	3,436	627	48	1	7	8	3	329	149	82
NSF	3,707	2,781	813	459	143	193	34	655	174	310
USDA	1,225	1,144	7	21	3	3	438	492	11	169
All other Federal	6,105	3,878	773	518	108	120	247	766	530	816
Institutional support	51,236	40,976	4,149	1,623	2,822	1,178	1,384	9,771	8,573	11,476
Other outside support, total	8,172	5,551	540	283	138	281	441	1,762	756	1,350
All other U.S.	6,781	4,643	487	241	93	240	365	1,533	727	957
Foreign	1,391	908	53	42	45	41	76	229	29	393
Self-support	54,523	33,475	460	883	927	1,660	895	3,760	13,631	11,259

See explanatory information and SOURCES at end of table.

Appendix table 4-10. Full-time graduate students in science, engineering, and health in all institutions, by sex, source of major support, and field: 1995

Page 2 of 2

Source of major support	Total engineering: Engineering, total	Aerospace engineering	Chemical engineering	Civil engineering	Electrical engineering	Industrial engineering	Mechanical engineering	Metallurgical and materials engineering	Other engineering	Health fields
					Total					
Total, all sources	67,862	2,693	5,962	12,248	18,303	5,328	11,119	3,880	8,329	42,219
Federal, total	16,323	1,109	1,754	1,970	4,085	648	2,773	1,544	2,440	8,001
Dept. of Defense	4,807	535	164	290	1,706	188	821	468	635	382
Dept. of HHS, total	918	5	163	41	113	54	93	25	424	5,684
NIH	768	1	136	31	84	27	82	11	396	2,453
Other HHS	150	4	27	10	29	27	11	14	28	3,231
NSF	4,611	121	761	530	1,353	175	742	495	434	99
USDA	342	2	66	53	34	0	4	3	180	55
All other Federal	5,645	446	600	1,056	879	231	1,113	553	767	1,781
Institutional support	23,844	817	2,262	4,861	6,234	1,858	3,896	1,177	2,739	9,070
Other outside support, total	9,121	234	1,105	1,180	2,552	498	1,606	708	1,238	2,069
All other U.S.	7,477	178	967	892	2,134	420	1,352	592	942	1,538
Foreign	1,644	56	138	288	418	78	254	116	296	531
Self-support	18,574	533	841	4,237	5,432	2,324	2,844	451	1,912	23,079
					Men					
Total, all sources	56,324	2,417	4,742	9,431	15,835	4,158	9,988	3,064	6,689	11,484
Federal, total	13,697	995	1,406	1,517	3,578	511	2,476	1,248	1,966	2,283
Dept. of Defense	4,250	500	140	232	1,528	157	758	387	548	195
Dept. of HHS, total	692	5	125	26	95	31	80	22	308	1,544
NIH	575	1	100	17	72	19	71	11	284	1,089
Other HHS	117	4	25	9	23	12	9	11	24	455
NSF	3,734	96	594	399	1,149	139	646	387	324	50
USDA	280	1	54	44	30	0	3	1	147	36
All other Federal	4,741	393	493	816	776	184	989	451	639	458
Institutional support	19,627	707	1,802	3,706	5,421	1,420	3,455	909	2,207	3,027
Other outside support, total	7,747	219	867	948	2,263	420	1,467	563	1,000	822
All other U.S.	6,278	163	764	693	1,873	345	1,226	469	745	599
Foreign	1,469	56	103	255	390	75	241	94	255	223
Self-support	15,253	496	667	3,260	4,573	1,807	2,590	344	1,516	5,352
					Women					
Total, all sources	11,538	276	1,220	2,817	2,468	1,170	1,131	816	1,640	30,735
Federal, total	2,626	114	348	453	507	137	297	296	474	5,718
Dept. of Defense	557	35	24	58	178	31	63	81	87	187
Dept. of HHS, total	226	0	38	15	18	23	13	3	116	4,140
NIH	193	0	36	14	12	8	11	0	112	1,364
Other HHS	33	0	2	1	6	15	2	3	4	2,776
NSF	877	25	167	131	204	36	96	108	110	49
USDA	62	1	12	9	4	0	1	2	33	19
All other Federal	904	53	107	240	103	47	124	102	128	1,323
Institutional support	4,217	110	460	1,155	813	438	441	268	532	6,043
Other outside support, total	1,374	15	238	232	289	78	139	145	238	1,247
All other U.S.	1,199	15	203	199	261	75	126	123	197	939
Foreign	175	0	35	33	28	3	13	22	41	308
Self-support	3,321	37	174	977	859	517	254	107	396	17,727

NOTE: Because of rounding, details may not add to totals.

SOURCE: National Science Foundation/SRS, Survey of Graduate Students and Postdoctorates in Science and Engineering.

Appendix table 4-11. Female graduate science and engineering student enrollment, by institutional rank: 1985-1995

	Academic Institution	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
1	University of Minnesota, all campuses	1,496	1,562	1,545	1,613	1,748	1,711	1,791	1,871	1,996	1,893	1,880
2	University of Wisconsin-Madison	1,263	1,327	1,359	1,415	1,475	1,565	1,639	1,720	1,777	1,711	1,671
3	George Washington University	818	1,155	1,479	1,388	1,373	1,440	1,468	1,610	1,633	1,672	1,662
4	Rutgers the State University of NJ, all campuses	1,298	1,347	1,309	1,319	1,408	1,437	1,465	1,544	1,527	1,518	1,523
5	University of California-Berkeley	1,283	1,318	1,327	1,295	1,293	1,398	1,377	1,409	1,447	1,456	1,498
6	University of Michigan, all campuses	1,014	1,035	1,114	1,168	1,179	1,247	1,251	1,395	1,522	1,524	1,462
7	University of Colorado, all campuses	847	899	959	907	982	1,124	1,220	1,344	1,476	1,391	1,459
8	Indiana University, all campuses	587	643	702	705	912	1,252	1,331	1,419	1,472	1,440	1,423
9	University of Washington	1,003	1,058	1,085	1,143	1,188	1,284	1,320	1,346	1,340	1,376	1,411
10	University of Illinois at Urbana-Champaign	945	1,015	1,147	1,171	1,199	1,178	1,202	1,335	1,379	1,363	1,403
11	University of Maryland at College Park	1,070	1,059	1,071	1,109	1,155	1,197	1,173	1,248	1,292	1,354	1,386
12	Ohio State University, all campuses	1,000	1,067	1,149	1,164	1,160	1,132	1,330	1,325	1,390	1,340	1,363
13	Pennsylvania State University, all campuses	923	1,027	1,002	1,124	1,144	1,168	1,207	1,218	1,255	1,284	1,321
14	Cornell University, all campuses	883	969	982	1,010	1,034	1,051	1,097	1,308	1,298	1,317	1,320
15	New York University	1,374	1,290	1,241	1,094	1,151	1,125	1,242	1,216	1,322	1,300	1,312
16	Texas A&M University, all campuses	900	939	1,024	1,102	1,202	1,305	1,286	1,391	1,369	1,347	1,310
17	Harvard University	897	915	791	892	854	946	1,025	1,225	1,269	1,297	1,299
18	University of California-Los Angeles	838	837	856	875	916	924	1,027	1,074	1,188	1,332	1,263
19	University of Southern California	1,668	1,729	1,675	1,616	1,500	1,228	1,238	1,368	1,369	1,262	1,259
20	Teachers College, Columbia University	910	891	936	1,067	1,026	968	1,029	1,063	1,131	1,145	1,177
21	University of Massachusetts Central Office	703	745	694	913	890	959	975	996	1,070	1,108	1,149
22	American University	690	635	648	620	690	765	846	1,052	1,186	1,230	1,143
23	George Mason University	362	361	499	638	681	752	759	801	896	922	1,142
24	Nova Southeastern University	306	139	644	707	663	673	762	845	954	1,127	1,124
25	Stanford University	717	707	762	865	919	892	949	1,020	1,039	1,046	1,119
26	University of Texas at Austin	1,045	1,081	900	898	931	923	1,047	1,104	1,156	1,148	1,101
27	North Carolina State University at Raleigh	664	728	719	799	826	809	837	921	920	1,045	1,086
28	Michigan State University	755	815	753	767	863	854	900	958	1,064	1,070	1,077
29	Antioch University, all campuses	0	0	0	843	758	846	1,108	1,139	1,105	1,171	1,070
30	University of Pittsburgh, all campuses	708	672	697	713	740	845	883	1,109	1,130	1,146	1,068
31	Purdue University, all campuses	833	803	762	889	896	896	894	970	1,051	1,091	1,066
32	Louisiana State University, all campuses	633	638	634	625	605	664	732	809	891	1,027	1,048
33	University of Kansas, all campuses	573	568	555	564	627	665	715	710	758	1,075	1,047
34	Boston University	594	659	667	665	656	798	805	859	979	1,032	1,035
35	Virginia Polytechnic Institute and State University	798	788	790	683	808	850	852	876	927	935	1,035
36	University of North Carolina at Chapel Hill	742	731	767	832	913	943	913	979	1,031	1,046	1,023
37	University of Florida	721	725	740	797	757	804	830	890	975	992	1,020
38	Arizona State University Main	529	505	565	672	690	792	844	989	983	983	1,019
39	Massachusetts Institute of Technology	769	774	761	807	867	956	972	977	1,013	983	1,007
40	University of Arizona	879	935	839	871	880	857	881	901	939	942	997
41	University of California-Davis	823	899	819	852	861	922	853	860	912	922	951
42	SUNY at Buffalo, all campuses	653	685	828	825	785	841	916	934	964	910	885
43	Iowa State University	693	697	746	796	793	828	821	838	898	913	880
44	Wayne State University	526	586	519	552	702	766	756	792	769	860	854
45	Georgia Institute of Technology, all campuses	420	457	486	508	515	601	702	745	790	833	828
46	State University of New York at Albany	430	417	420	430	459	505	534	843	892	852	828
47	University of Connecticut, all campuses	570	590	634	621	636	694	749	803	809	795	826
48	University of Pennsylvania	775	755	747	759	817	790	797	785	804	780	802
49	University of Illinois at Chicago	635	673	673	638	714	760	807	838	809	797	799
50	University of Chicago	417	510	509	545	598	644	656	755	770	802	782

SOURCE: National Science Foundation/SRS. Survey of Graduate Students and Postdoctorates in Science and Engineering.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 4-12. Graduate science and engineering student enrollment in Historically Black Colleges and Universities, by field: 1985-1995

Academic discipline	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	Percent change 1985-1995	Percent change 1993-1995	Percent proportion 1985	Percent proportion 1995
Total science and engineering	3,404	3,290	3,042	3,319	3,285	3,490	3,527	3,734	3,975	4,526	4,489	31.9	12.9	100.0	100.0
Total sciences	3,062	2,916	2,707	2,939	2,902	3,096	3,115	3,251	3,497	3,941	3,902	27.4	11.6	90.0	86.9
Total physical sciences	320	299	300	328	336	322	332	363	397	437	453	41.6	14.1	9.4	10.1
Chemistry	228	196	197	204	233	203	206	211	237	270	271	18.9	14.3	6.7	6.0
Physics	72	84	100	112	94	112	120	146	145	153	170	136.1	17.2	2.1	3.8
Other physical sciences	20	19	3	12	9	7	6	6	15	14	12	-40.0	-20.0	0.6	0.3
Earth, atmospheric, and ocean sciences	34	19	16	36	27	48	60	80	92	75	82	141.2	-10.9	1.0	1.8
Earth sciences	17	19	16	13	2	6	3	5	4	2	2	-88.2	-50.0	0.5	0.0
Oceanography	0	0	0	23	25	37	41	41	37	36	35	100.0	-5.4	0.0	0.8
Other geosciences	17	0	0	0	0	5	16	34	51	37	45	164.7	-11.8	0.5	1.0
Mathematics and statistics	240	265	259	252	255	179	187	192	249	233	208	-13.3	-16.5	7.1	4.6
Computer science	304	279	229	277	290	404	429	437	425	450	415	36.5	-2.4	8.9	9.2
Agricultural sciences	66	55	52	64	66	131	122	133	115	155	185	180.3	60.9	1.9	4.1
Biological sciences	479	447	409	414	447	460	468	500	641	652	715	49.3	11.5	14.1	15.9
Psychology	404	419	374	443	440	448	447	506	550	699	580	43.6	5.5	11.9	12.9
Social sciences	1,215	1,133	1,068	1,125	1,041	1,104	1,070	1,040	1,028	1,240	1,264	4.0	23.0	35.7	28.2
Economics	224	206	169	180	148	125	102	138	125	120	101	-54.9	-19.2	6.6	2.2
Political science and public administration	345	389	367	399	335	376	407	454	447	611	673	95.1	50.6	10.1	15.0
Sociology	306	239	257	243	238	272	238	262	271	324	326	6.5	20.3	9.0	7.3
Linguistics	129	129	144	136	137	134	142	0	0	0	0	-100.0	0.0	3.8	0.0
Other social sciences	211	170	131	167	183	197	181	186	185	185	164	-22.3	-11.4	6.2	3.7
Engineering	342	374	335	380	383	394	412	483	478	585	587	71.6	22.8	10.0	13.1
Chemical engineering	0	0	0	0	0	0	16	28	28	27	33	100.0	17.9	0.0	0.7
Civil engineering	46	47	52	57	72	60	75	87	101	97	104	126.1	3.0	1.4	2.3
Electrical engineering	121	61	129	111	129	132	132	164	157	190	155	28.1	-1.3	3.6	3.5
Mechanical engineering	81	63	65	102	72	100	94	106	99	113	121	49.4	22.2	2.4	2.7
Industrial engineering	20	0	10	26	26	28	34	40	39	64	55	175.0	41.0	0.6	1.2
Other engineering	74	203	79	84	84	74	61	58	54	94	119	60.8	120.4	2.2	2.7

SOURCE: National Science Foundation/SRS. Survey of Graduate Students and Postdoctorates in Science and Engineering.

Appendix table 4-13. Female graduate science and engineering students attending Historically Black Colleges and Universities, by field: 1985-1995

Academic discipline	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	Percent change 1985-1995	Percent change 1993-1995	Percent proportion 1985	Percent proportion 1995
Total science and engineering	1,316	1,273	1,114	1,277	1,344	1,505	1,546	1,585	1,839	2,173	2,206	67.6	20.0	100.0	100.0
Total sciences	1,279	1,214	1,061	1,216	1,285	1,418	1,461	1,484	1,739	2,045	2,060	61.1	18.5	97.2	93.4
Total physical sciences	113	85	84	93	105	106	109	119	155	165	171	51.3	10.3	8.6	7.8
Chemistry	93	60	69	69	84	81	80	85	113	130	123	32.3	8.8	7.1	5.6
Physics	8	13	14	18	14	20	24	29	33	29	42	425.0	27.3	0.6	1.9
Other physical sciences	12	12	1	6	7	5	5	5	9	6	6	-50.0	-33.3	0.9	0.3
Earth, atmospheric, and ocean sciences	7	9	5	17	12	22	25	33	39	41	47	571.4	20.5	0.5	2.1
Earth sciences	5	9	5	4	0	2	2	2	2	2	2	-60.0	0.0	0.4	0.1
Oceanography	0	0	0	13	12	17	18	19	16	18	21	100.0	31.3	0.0	1.0
Other geosciences	2	0	0	0	0	3	5	12	21	21	24	1,100.0	14.3	0.2	1.1
Mathematics and statistics	100	105	81	84	92	70	70	71	122	116	84	-16.0	-31.1	7.6	3.8
Computer science	84	83	58	96	107	154	150	149	152	153	176	109.5	15.8	6.4	8.0
Agricultural sciences	15	9	8	8	9	27	31	33	60	81	93	520.0	55.0	1.1	4.2
Biological sciences	257	222	200	201	240	240	237	263	335	361	414	61.1	23.6	19.5	18.8
Psychology	227	252	225	284	294	291	318	328	367	491	398	75.3	8.4	17.2	18.0
Social Sciences	476	449	400	433	426	508	521	488	509	637	677	42.2	33.0	36.2	30.7
Economics	38	37	33	32	32	29	34	43	33	30	32	-15.8	-3.0	2.9	1.5
Political science and public administration	136	139	117	135	107	155	194	219	224	322	374	175.0	67.0	10.3	17.0
Sociology	146	135	137	125	134	158	114	130	153	188	185	26.7	20.9	11.1	8.4
Linguistics	86	86	69	66	83	81	86	0	0	0	0	-100.0	0.0	6.5	0.0
Other social sciences	70	52	44	75	70	85	93	96	99	97	86	22.9	-13.1	5.3	3.9
Total engineering	37	59	53	61	59	87	85	101	100	128	146	294.6	46.0	2.8	6.6
Chemical engineering	0	0	0	0	0	0	6	10	10	10	13	100.0	30.0	0.0	0.6
Civil engineering	9	20	22	27	17	12	13	15	15	20	25	177.8	66.7	0.7	1.1
Electrical engineering	12	11	17	12	16	39	28	31	31	32	35	191.7	12.9	0.9	1.6
Mechanical engineering	7	3	6	9	6	11	14	9	11	19	21	200.0	90.9	0.5	1.0
Industrial engineering	7	0	2	5	9	15	14	24	17	23	23	228.6	35.3	0.5	1.0
Other engineering	2	25	6	8	11	10	10	12	16	24	29	1,350.0	81.3	0.2	1.3

SOURCE: National Science Foundation/SRS. Survey of Graduate Students and Postdoctorates in Science and Engineering.

Appendix table 4-14. U.S. citizen and permanent resident graduate students in science and engineering, by field for all races and ethnicities: 1985-1995

Page 1 of 1

Academic discipline	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	Percent change 1985-1995	Percent change 1993-1995	Percent proportion 1985	Percent proportion 1995
Total science and engineering	281,314	284,144	284,565	281,672	284,686	294,339	304,073	321,281	330,447	329,391	325,135	15.6	-1.6	100.0	100.0
Total sciences	214,145	214,215	213,989	214,069	217,340	224,913	231,840	244,686	252,833	253,326	253,093	18.2	0.1	76.1	77.8
Total physical sciences	22,040	22,218	22,099	21,890	21,843	21,609	21,985	22,543	23,066	22,742	22,028	-0.1	-4.5	7.8	6.8
Astronomy	517	526	537	565	625	618	612	644	663	711	680	31.5	2.6	0.2	0.2
Chemistry	13,934	13,902	13,528	12,920	12,721	12,475	12,509	13,022	13,456	13,385	13,181	-5.4	-2.0	5.0	4.1
Physics	7,278	7,447	7,692	8,107	8,188	8,221	8,511	8,495	8,557	8,217	7,764	6.7	-9.3	2.6	2.4
Other physical sciences	311	343	342	298	309	295	353	382	390	429	403	29.6	3.3	0.1	0.1
Total earth sciences	13,554	12,996	12,181	11,459	11,068	11,309	11,583	12,343	12,795	12,776	12,866	-5.1	0.6	4.8	4.0
Atmospheric science	755	748	713	693	663	648	658	765	815	844	806	6.8	-1.1	0.3	0.2
Earth sciences	9,268	8,695	7,785	7,147	6,648	6,211	6,032	6,076	6,113	5,991	6,059	-34.6	-0.9	3.3	1.9
Oceanography	1,736	1,704	1,723	1,568	1,644	1,776	1,777	1,937	2,022	2,132	2,082	19.9	3.0	0.6	0.6
Other geosciences	1,795	1,849	1,960	2,051	2,113	2,674	3,116	3,565	3,845	3,809	3,919	118.3	1.9	0.6	1.2
Mathematics and statistics	12,218	12,139	12,379	12,652	12,564	13,210	13,318	13,878	13,866	13,496	12,688	3.8	-8.5	4.3	3.9
Computer science	22,272	23,291	23,274	23,243	22,788	23,351	22,988	24,165	24,344	23,200	22,796	2.4	-6.4	7.9	7.0
Agricultural sciences	8,905	8,665	8,204	8,206	8,251	8,133	8,298	8,649	8,778	9,060	9,304	4.5	6.0	3.2	2.9
Biological sciences	39,245	38,967	38,069	37,876	38,080	38,470	39,282	41,358	43,525	45,274	46,455	18.4	6.7	14.0	14.3
Psychology	39,229	39,739	41,073	42,316	43,897	46,350	49,355	51,638	52,771	52,363	52,126	32.9	-1.2	13.9	16.0
Social sciences	56,682	56,200	56,710	56,427	58,849	62,481	65,031	70,112	73,688	74,415	74,830	32.0	1.5	20.1	23.0
Economics	9,234	8,679	8,493	8,207	8,182	8,252	8,589	9,040	9,204	8,949	8,617	-6.7	-6.4	3.3	2.7
Political science and public administration	23,446	23,455	23,712	24,003	25,648	27,095	28,099	30,259	31,614	30,965	30,983	32.1	-2.0	8.3	9.5
Sociology	6,044	5,970	6,267	6,266	6,589	7,145	7,570	8,339	8,809	9,055	9,212	52.4	4.6	2.1	2.8
Anthropology	5,090	5,173	5,173	5,215	5,365	5,688	5,907	6,309	6,561	6,878	6,994	37.4	6.6	1.8	2.2
Linguisics	1,983	2,016	2,179	2,102	2,109	2,167	2,166	2,180	2,260	2,267	2,197	10.8	-2.8	0.7	0.7
History of science	217	224	251	242	264	287	286	300	314	331	350	61.3	11.5	0.1	0.1
Other social sciences	10,668	10,483	10,635	10,392	10,692	11,847	12,414	13,685	14,926	15,970	16,477	54.5	10.4	3.8	5.1
Total engineering	67,169	69,929	70,576	67,603	67,346	69,426	72,233	76,595	77,614	76,065	72,042	7.3	-7.2	23.9	22.2
Aeronautical engineering	1,729	1,932	2,144	2,113	2,431	2,703	2,892	2,854	2,739	2,476	2,157	24.8	-21.2	0.6	0.7
Chemical engineering	4,729	4,640	4,625	4,071	3,662	3,791	3,939	4,122	4,348	4,595	4,482	-5.2	3.1	1.7	1.4
Civil engineering	9,515	9,286	9,095	9,000	9,074	9,628	10,854	12,734	13,299	13,991	13,618	43.1	2.4	3.4	4.2
Electrical engineering	19,760	20,425	21,282	21,670	22,109	22,127	22,366	23,627	22,897	21,644	19,752	0.0	-13.7	7.0	6.1
Mechanical engineering	9,370	10,329	10,855	10,131	10,450	10,799	11,056	11,875	12,199	11,923	10,918	16.5	-10.5	3.3	3.4
Materials engineering	2,574	2,600	2,673	2,557	2,653	2,826	2,992	3,301	3,201	3,225	2,987	16.0	-6.7	0.9	0.9
Industrial engineering	8,552	9,364	9,607	8,710	8,176	8,129	8,902	9,682	10,153	10,120	9,865	15.4	-2.8	3.0	3.0
Other engineering	10,940	11,353	10,295	9,351	8,791	9,423	9,232	8,400	8,778	8,091	8,263	-24.5	-5.9	3.9	2.5

SOURCE: National Science Foundation/SRS. Survey of Graduate Students and Postdoctorates in Science and Engineering.

Appendix table 4-15. Black graduate students in science and engineering, by field: 1985-1995 (U.S. citizens and permanent residents only)

Page 1 of 1

Academic discipline	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	Percent change 1985-1995	Percent change 1993-1995
Total science and engineering	10,453	10,460	10,426	11,191	11,775	12,774	13,691	15,449	17,147	17,665	18,366	75.7	7.1
Total sciences	9,066	9,008	9,010	9,691	10,159	10,988	11,666	13,075	14,588	14,882	15,494	70.9	6.2
Total physical sciences	535	524	536	569	633	654	699	807	843	856	894	67.1	6.0
Astronomy	6	5	6	6	6	8	11	10	12	8	11	83.3	-8.3
Chemistry	381	356	374	372	440	452	477	566	594	596	621	63.0	4.5
Physics	121	125	136	171	173	177	189	211	211	242	248	105.0	17.5
Other physical sciences	27	38	20	20	14	17	22	20	26	10	14	-48.1	-46.2
Total earth sciences	127	98	93	107	95	123	141	202	227	203	.220	73.2	-3.1
Atmospheric science	7	5	2	7	7	9	6	13	13	12	18	157.1	38.5
Earth sciences	70	46	49	50	43	51	55	73	67	57	67	-4.3	0.0
Oceanography	18	18	14	19	21	21	24	28	29	40	34	88.9	17.2
Other geosciences	32	29	28	31	24	42	56	88	118	94	101	215.6	-14.4
Mathematics and statistics	409	449	441	422	463	511	524	579	710	672	690	68.7	-2.8
Computer science	622	702	769	839	848	985	1,093	1,108	1,193	1,216	1,189	91.2	-0.3
Agricultural sciences	137	120	133	143	153	158	145	209	235	239	293	113.9	24.7
Biological sciences	1,183	1,103	1,055	1,153	1,212	1,249	1,317	1,493	1,737	1,709	1,879	58.8	8.2
Psychology	1,790	1,786	1,794	1,945	2,061	2,226	2,455	2,762	3,288	3,545	3,422	91.2	4.1
Social sciences	4,263	4,226	4,189	4,513	4,694	5,082	5,292	5,915	6,355	6,442	6,907	62.0	8.7
Economics	392	392	379	368	359	368	365	453	482	447	466	18.9	-3.3
Political science and public administration	2,143	2,245	2,133	2,365	2,500	2,715	2,831	3,193	3,258	3,234	3,559	66.1	9.2
Sociology	580	514	557	587	598	693	752	869	985	1,057	1,095	88.8	11.2
Anthropology	95	95	101	106	116	128	132	174	176	209	215	126.3	22.2
Linguisics	119	123	142	146	151	143	145	46	63	59	51	-57.1	-19.0
History of science	2	4	5	3	3	5	5	6	4	7	8	300.0	100.0
Other social sciences	932	853	872	938	967	1,030	1,062	1,174	1,387	1,429	1,513	62.3	9.1
Total engineering	1,387	1,452	1,416	1,500	1,616	1,786	2,025	2,374	2,559	2,783	2,872	107.1	12.2
Aeronautical engineering	24	25	25	24	27	38	44	47	56	61	51	112.5	-8.9
Chemical engineering	71	85	87	84	79	84	119	144	159	157	174	145.1	9.4
Civil engineering	182	172	160	189	244	232	279	343	393	423	474	160.4	20.6
Electrical engineering	455	390	422	514	564	612	669	771	863	861	831	82.6	-3.7
Mechanical engineering	161	161	187	200	200	247	246	320	336	398	403	150.3	19.9
Materials engineering	33	32	23	26	36	55	55	61	72	88	86	160.6	19.4
Industrial engineering	233	270	270	267	253	294	384	444	440	507	525	125.3	19.3
Other engineering	228	317	242	196	213	224	229	244	240	288	328	43.9	36.7

SOURCE: National Science Foundation/SRS. Survey of Graduate Students and Postdoctorates in Science and Engineering.

Appendix table 4-16. American Indian or Alaskan Native graduate students in science and engineering, by field: 1985-1995 (U.S. citizens and permanent residents only)

Page 1 of 1

Academic discipline	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	Percent change 1985-1995	Percent change 1993-1995
Total science and engineering	737	743	782	918	860	1,054	1,120	1,244	1,312	1,383	1,524	106.8	16.2
Total sciences	615	613	659	775	738	902	935	1,067	1,101	1,141	1,293	110.2	17.4
Total physical sciences	35	48	46	52	44	63	62	67	81	67	78	122.9	-3.7
Astronomy	1	1	1	0	0	2	2	4	3	3	3	200.0	0.0
Chemistry	25	33	29	30	25	44	43	37	54	46	45	80.0	-16.7
Physics	9	13	16	20	19	16	15	26	22	16	30	233.3	36.4
Other physical sciences	0	1	0	2	0	1	2	0	2	2	0	0.0	-100.0
Total earth sciences	23	19	18	27	26	30	29	35	46	49	53	130.4	15.2
Atmospheric science	0	1	0	0	0	0	0	0	2	3	4	N/A	100.0
Earth sciences	17	14	16	24	19	22	20	25	27	29	27	58.8	0.0
Oceanography	2	2	1	0	0	1	3	4	3	6	8	300.0	166.7
Other geosciences	4	2	1	3	7	7	6	6	14	11	14	250.0	0.0
Mathematics and statistics	22	31	48	32	34	20	20	27	32	36	70	218.2	118.8
Computer science	57	21	28	39	40	44	42	72	68	43	55	-3.5	-19.1
Agricultural sciences	22	24	29	33	25	20	31	39	34	37	58	163.6	70.6
Biological sciences	88	105	90	104	85	142	129	141	157	183	214	143.2	36.3
Psychology	135	134	152	177	180	235	252	291	290	317	331	145.2	14.1
Social sciences	233	231	248	311	304	348	370	395	393	409	434	86.3	10.4
Economics	17	28	19	85	70	68	57	35	23	24	26	52.9	13.0
Political science and public administration	108	89	98	96	91	100	114	126	141	145	137	26.9	-2.8
Sociology	34	29	38	30	37	50	55	64	62	62	58	70.6	-6.5
Anthropology	21	27	36	45	53	66	68	74	79	89	103	390.5	30.4
Linguisics	8	9	13	6	10	8	7	3	3	7	9	12.5	200.0
History of science	0	0	0	0	0	1	0	1	0	1	1	N/A	N/A
Other social sciences	45	49	44	49	43	55	69	92	85	81	100	122.2	17.6
Total engineering	122	130	123	143	122	152	185	177	211	242	231	89.3	9.5
Aeronautical engineering	2	8	5	3	5	6	5	6	8	6	8	300.0	0.0
Chemical engineering	8	5	26	24	10	5	22	15	14	18	21	162.5	50.0
Civil engineering	16	28	9	22	22	37	34	31	43	38	42	162.5	-2.3
Electrical engineering	30	43	18	39	37	49	39	38	45	53	52	73.3	15.6
Mechanical engineering	25	15	23	12	13	15	21	24	30	54	44	76.0	46.7
Materials engineering	6	3	2	4	5	2	1	4	4	6	8	33.3	100.0
Industrial engineering	11	10	24	14	15	23	39	42	36	23	23	109.1	-36.1
Other engineering	24	18	16	25	15	15	24	17	31	44	33	37.5	6.5

SOURCE: National Science Foundation/SRS. Survey of Graduate Students and Postdoctorates in Science and Engineering.

Appendix table 4-17. Hispanic graduate students in science and engineering, by field: 1985-1995 (U.S. citizens and permanent residents only)

Page 1 of 1

Academic discipline	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	Percent change 1985-1995	Percent change 1993-1995
Total science and engineering	8,614	8,658	8,823	9,098	9,436	10,159	11,045	12,248	13,386	13,284	14,089	63.6	5.3
Total sciences	7,133	7,056	7,093	7,379	7,729	8,273	8,921	9,785	10,692	10,427	11,258	57.8	5.3
Total physical sciences	599	629	591	624	680	642	649	680	747	675	732	22.2	-2.0
Astronomy	7	7	8	6	13	7	11	11	13	16	16	128.6	23.1
Chemistry	438	463	419	438	464	426	398	428	472	442	486	11.0	3.0
Physics	151	153	159	178	195	203	233	229	252	211	219	45.0	-13.1
Other physical sciences	3	6	5	2	8	6	7	12	10	6	11	266.7	10.0
Total earth sciences	238	237	227	210	209	241	250	308	371	344	369	55.0	-0.5
Atmospheric science	11	13	10	9	8	9	24	11	15	14	10	-9.1	-33.3
Earth sciences	105	98	99	112	110	130	116	141	160	140	154	46.7	-3.8
Oceanography	98	101	90	68	68	61	59	65	102	88	97	-1.0	-4.9
Other geosciences	24	25	28	21	23	41	51	91	94	102	108	350.0	14.9
Mathematics and statistics	262	270	266	328	305	351	349	376	415	369	400	52.7	-3.6
Computer science	488	453	551	516	542	565	631	706	699	637	660	35.2	-5.6
Agricultural sciences	321	302	221	278	297	272	279	279	308	263	289	-10.0	-6.2
Biological sciences	935	950	1,032	1,116	1,200	1,220	1,374	1,459	1,649	1,651	1,810	93.6	9.8
Psychology	1,611	1,707	1,665	1,722	1,751	2,160	2,365	2,373	2,564	2,488	2,777	72.4	8.3
Social sciences	2,679	2,508	2,540	2,585	2,745	2,822	3,024	3,604	3,939	4,000	4,221	57.6	7.2
Economics	315	309	292	321	305	279	336	382	391	404	420	33.3	7.4
Political science and public administration	1,445	1,405	1,254	1,330	1,390	1,361	1,453	1,776	1,902	1,789	1,926	33.3	1.3
Sociology	231	187	249	245	276	316	353	408	485	494	532	130.3	9.7
Anthropology	151	136	152	150	162	173	207	222	248	295	343	127.2	38.3
Linguisics	68	68	93	113	128	136	132	168	165	158	138	102.9	-16.4
History of science	2	1	3	5	3	4	4	3	3	5	4	100.0	33.3
Other social sciences	467	402	497	421	481	553	539	645	745	855	858	83.7	15.2
Total engineering	1,481	1,602	1,730	1,719	1,707	1,886	2,124	2,463	2,694	2,857	2,831	91.2	5.1
Aeronautical engineering	33	24	37	45	49	51	54	72	70	75	65	97.0	-7.1
Chemical engineering	107	116	117	135	111	143	159	176	180	171	202	88.8	12.2
Civil engineering	251	252	263	263	275	302	383	478	550	549	590	135.1	7.3
Electrical engineering	443	464	521	528	558	576	661	748	841	853	794	79.2	-5.6
Mechanical engineering	181	243	282	217	214	282	338	394	382	451	420	132.0	9.9
Materials engineering	37	44	48	48	53	71	56	73	76	122	102	175.7	34.2
Industrial engineering	253	275	281	280	241	231	253	297	332	375	392	54.9	18.1
Other engineering	176	184	181	203	206	230	220	225	263	261	266	51.1	1.1

SOURCE: National Science Foundation/SRS. Survey of Graduate Students and Postdoctorates in Science and Engineering.

Appendix table 4-18. Asian or Pacific Islander graduate students in science and engineering, by field: 1985-1995 (U.S. citizens and permanent residents only)

Academic discipline	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	Percent change 1985-1995	Percent change 1993-1995
Total science and engineering	12,003	12,775	14,565	15,188	15,693	17,156	18,139	21,762	24,149	26,457	26,015	116.7	7.7
Total sciences	7,198	7,661	8,716	9,278	9,682	10,469	11,023	13,270	15,150	16,656	16,897	134.7	11.5
Total physical sciences	937	910	1,047	1,253	1,175	1,200	1,429	1,615	1,973	1,925	1,797	91.8	-8.9
Astronomy	6	12	14	37	36	38	30	25	24	35	30	400.0	25.0
Chemistry	660	631	715	720	680	653	820	923	1,186	1,174	1,121	69.8	-5.5
Physics	265	259	304	481	452	501	557	640	732	683	629	137.4	-14.1
Other physical sciences	6	8	14	15	7	8	22	27	31	33	17	183.3	-45.2
Total earth sciences	194	153	179	209	207	258	267	383	469	454	423	118.0	-9.8
Atmospheric science	25	27	37	47	45	26	28	51	55	66	69	176.0	25.5
Earth sciences	110	67	69	82	96	116	137	162	217	180	151	37.3	-30.4
Oceanography	27	32	43	48	30	43	36	70	66	74	83	207.4	25.8
Other geosciences	32	27	30	32	36	73	66	100	131	134	120	275.0	-8.4
Mathematics and statistics	623	706	769	756	703	822	866	963	1,020	1,199	1,124	80.4	10.2
Computer science	1,868	2,064	2,466	2,682	2,727	2,888	2,858	3,400	3,572	4,103	4,103	119.6	14.9
Agricultural sciences	138	135	169	217	236	242	225	215	264	276	273	97.8	3.4
Biological sciences	1,446	1,564	1,650	1,799	1,986	2,228	2,346	2,822	3,456	3,913	4,247	193.7	22.9
Psychology	559	619	727	747	817	962	1,040	1,284	1,476	1,586	1,596	185.5	8.1
Social sciences	1,433	1,510	1,709	1,615	1,831	1,869	1,992	2,588	2,920	3,200	3,334	132.7	14.2
Economics	314	390	414	361	427	445	424	563	639	666	643	104.8	0.6
Political science and public administration	676	595	651	595	710	714	810	960	1,086	1,091	1,227	81.5	13.0
Sociology	155	149	191	194	212	216	220	271	343	428	433	179.4	26.2
Anthropology	53	69	98	107	109	114	117	172	172	192	208	292.5	20.9
Linguisics	45	53	109	108	83	84	91	141	139	186	179	297.8	28.8
History of science	3	3	10	12	15	5	7	8	12	9	14	366.7	16.7
Other social sciences	187	251	236	238	275	291	323	473	529	628	630	236.9	19.1
Total engineering	4,805	5,114	5,849	5,910	6,011	6,687	7,116	8,492	8,999	9,801	9,118	89.8	1.3
Aeronautical engineering	84	101	109	125	143	152	196	181	224	223	177	110.7	-21.0
Chemical engineering	277	287	348	302	235	316	399	379	461	521	461	66.4	0.0
Civil engineering	436	444	582	601	597	760	837	1,043	1,167	1,374	1,360	211.9	16.5
Electrical engineering	1,966	2,071	2,453	2,587	2,703	3,050	3,026	3,755	3,749	4,088	3,762	91.4	0.3
Mechanical engineering	794	811	883	769	824	830	985	1,179	1,307	1,410	1,243	56.5	-4.9
Materials engineering	219	235	241	250	273	224	260	327	336	346	307	40.2	-8.6
Industrial engineering	326	397	440	467	451	450	586	794	863	855	829	154.3	-3.9
Other engineering	703	768	793	809	785	905	827	834	892	984	979	39.3	9.8

SOURCE: National Science Foundation/SRS. Survey of Graduate Students and Postdoctorates in Science and Engineering.

Appendix table 4-19. White non-Hispanic graduate students in science and engineering, by field: 1985-1995 (U.S. citizens and permanent residents only)

Academic discipline	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	Percent change 1985-1995	Percent change 1993-1995
Total science and engineering	223,682	227,547	228,809	229,037	229,694	238,492	243,608	253,516	257,009	255,976	246,776	10.3	-4.0
Total sciences	173,541	174,621	175,008	176,708	178,201	185,285	188,824	196,120	199,558	199,945	194,663	12.2	-2.5
Total physical sciences	18,324	18,553	18,087	18,282	18,318	18,433	18,402	18,527	18,582	18,422	17,506	-4.5	-5.8
Astronomy	472	483	486	509	553	548	544	576	580	624	577	22.2	-0.5
Chemistry	11,378	11,351	10,763	10,597	10,498	10,523	10,414	10,592	10,687	10,656	10,323	-9.3	-3.4
Physics	6,227	6,459	6,561	6,925	7,003	7,110	7,164	7,063	7,005	6,771	6,250	0.4	-10.8
Other physical sciences	247	260	277	251	264	252	280	296	310	371	356	44.1	14.8
Total earth sciences	11,760	11,587	10,924	10,415	10,137	10,375	10,531	10,893	11,145	11,351	11,324	-3.7	1.6
Atmospheric science	708	702	657	623	594	597	589	675	714	733	691	-2.4	-3.2
Earth sciences	7,916	7,700	7,099	6,565	6,125	5,747	5,510	5,389	5,384	5,391	5,402	-31.8	0.3
Oceanography	1,507	1,501	1,425	1,380	1,468	1,580	1,550	1,653	1,701	1,868	1,811	20.2	6.5
Other geosciences	1,629	1,684	1,743	1,847	1,950	2,451	2,882	3,176	3,346	3,359	3,420	109.9	2.2
Mathematics and statistics	9,787	9,528	9,650	10,133	10,064	10,605	10,457	10,851	10,572	10,486	9,630	-1.6	-8.9
Computer science	15,724	16,525	17,156	17,346	16,496	17,292	16,464	16,894	16,801	15,759	14,795	-5.9	-11.9
Agricultural sciences	7,881	7,785	7,435	7,315	7,294	7,251	7,481	7,679	7,731	7,972	8,013	1.7	3.6
Biological sciences	34,002	33,779	32,643	32,725	32,361	32,677	33,058	34,229	35,094	36,389	36,489	7.3	4.0
Psychology	32,757	33,166	34,785	35,920	37,227	39,247	40,990	42,500	42,744	42,191	40,679	24.2	-4.8
Social sciences	43,306	43,698	44,328	44,572	46,304	49,405	51,441	54,547	56,889	57,375	56,227	29.8	-1.2
Economics	7,166	7,092	6,674	6,501	6,527	6,565	6,832	7,099	7,173	7,036	6,682	-6.8	-6.8
Political science and public administration	16,772	17,189	18,132	18,624	19,529	20,848	21,657	22,991	24,050	23,348	22,436	33.8	-6.7
Sociology	4,796	4,653	4,833	4,845	5,233	5,621	5,944	6,405	6,552	6,737	6,678	39.2	1.9
Anthropology	4,553	4,645	4,448	4,457	4,631	4,939	5,116	5,359	5,581	5,827	5,812	27.7	4.1
Linguisics	1,672	1,595	1,720	1,683	1,670	1,728	1,697	1,747	1,770	1,770	1,688	1.0	-4.6
History of science	210	216	223	222	227	271	269	280	294	308	313	49.0	6.5
Other social sciences	8,137	8,308	8,298	8,240	8,487	9,433	9,926	10,666	11,469	12,349	12,618	55.1	10.0
Total engineering	50,141	52,926	53,801	52,329	51,493	53,207	54,784	57,396	57,451	56,031	52,113	3.9	-9.3
Aeronautical engineering	1,342	1,520	1,631	1,751	2,015	2,241	2,196	2,245	2,071	2,024	1,774	32.2	-14.3
Chemical engineering	3,865	3,886	3,827	3,382	3,097	3,151	3,140	3,236	3,388	3,519	3,418	-11.6	0.9
Civil engineering	7,327	7,256	7,066	7,370	7,337	7,727	8,684	10,196	10,415	11,025	10,460	42.8	0.4
Electrical engineering	13,461	13,992	14,922	15,404	15,818	15,662	15,571	15,996	15,661	14,336	12,751	-5.3	-18.6
Mechanical engineering	7,159	7,864	7,984	7,841	7,633	8,238	8,416	9,035	9,029	8,890	8,059	12.6	-10.7
Materials engineering	2,092	2,101	2,247	2,137	2,196	2,320	2,502	2,683	2,542	2,550	2,377	13.6	-6.5
Industrial engineering	7,031	7,433	7,907	7,130	6,537	6,407	7,016	7,375	7,448	7,503	7,084	0.8	-4.9
Other engineering	7,864	8,874	8,217	7,314	6,860	7,461	7,259	6,630	6,897	6,184	6,190	-21.3	-10.3

SOURCE: National Science Foundation/SRS. Survey of Graduate Students and Postdoctorates in Science and Engineering.

Appendix table 4-20. Graduate students in science and engineering of other or unknown races and ethnicities, by field: 1985-1995 (U.S. citizens and permanent residents only)

Page 1 of 1

Academic discipline	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	Percent change 1985-1995	Percent change 1993-1995
Total science and engineering	25,825	23,961	21,160	16,240	17,228	14,704	16,470	17,062	17,444	14,626	18,365	-28.9	5.3
Total sciences	16,592	15,256	13,503	10,238	10,831	8,996	10,471	11,369	11,744	10,275	13,488	-18.7	14.9
Total physical sciences	1,610	1,554	1,792	1,110	993	617	744	847	840	797	1,021	-36.6	21.5
Astronomy	25	18	22	7	17	15	14	18	31	25	43	72.0	38.7
Chemistry	1,052	1,068	1,228	763	614	377	357	476	463	471	585	-44.4	26.3
Physics	505	438	516	332	346	214	353	326	335	294	388	-23.2	15.8
Other physical sciences	28	30	26	8	16	11	20	27	11	7	5	-82.1	-54.5
Total earth sciences	1,212	902	740	491	394	282	365	522	537	375	477	-60.6	-11.2
Atmospheric science	4	0	7	7	9	7	11	15	16	16	14	250.0	-12.5
Earth sciences	1,050	770	453	314	255	145	194	286	258	194	258	-75.4	0.0
Oceanography	84	50	150	53	57	70	105	117	121	56	49	-41.7	-59.5
Other geosciences	74	82	130	117	73	60	55	104	142	109	156	110.8	9.9
Mathematics and statistics	1,115	1,155	1,205	981	995	901	1,102	1,082	1,117	734	774	-30.6	-30.7
Computer science	3,513	3,526	2,304	1,821	2,135	1,577	1,900	1,985	2,011	1,442	1,994	-43.2	-0.8
Agricultural sciences	406	299	217	220	246	190	137	228	206	273	378	-6.9	83.5
Biological sciences	1,591	1,466	1,599	979	1,236	954	1,058	1,214	1,432	1,429	1,816	14.1	26.8
Psychology	2,377	2,327	1,950	1,805	1,861	1,520	2,253	2,428	2,409	2,236	3,321	39.7	37.9
Social sciences	4,768	4,027	3,696	2,831	2,971	2,955	2,912	3,063	3,192	2,989	3,707	-22.3	16.1
Economics	1,030	668	715	571	494	527	575	508	496	372	380	-63.1	-23.4
Political science and public administration	2,302	1,932	1,444	993	1,428	1,357	1,234	1,213	1,177	1,358	1,698	-26.2	44.3
Sociology	248	438	399	365	233	249	246	322	382	277	416	67.7	8.9
Anthropology	217	201	338	350	294	268	267	308	305	266	313	44.2	2.6
Linguisics	71	168	102	46	67	68	94	75	120	87	132	85.9	10.0
History of science	0	0	10	0	16	1	1	2	1	1	10	N/A	900.0
Other social sciences	900	620	688	506	439	485	495	635	711	628	758	-15.8	6.6
Total engineering	9,233	8,705	7,657	6,002	6,397	5,708	5,999	5,693	5,700	4,351	4,877	-47.2	-14.4
Aeronautical engineering	244	254	337	165	192	215	397	303	310	87	82	-66.4	-73.5
Chemical engineering	401	261	220	144	130	92	100	172	146	209	206	-48.6	41.1
Civil engineering	1,303	1,134	1,015	555	599	570	637	643	731	582	692	-46.9	-5.3
Electrical engineering	3,405	3,465	2,946	2,598	2,429	2,178	2,400	2,319	1,738	1,453	1,562	-54.1	-10.1
Mechanical engineering	1,050	1,235	1,496	1,092	1,566	1,187	1,050	923	1,115	720	749	-28.7	-32.8
Materials engineering	187	185	112	92	90	154	118	153	171	113	107	-42.8	-37.4
Industrial engineering	698	979	685	552	679	724	624	730	1,034	857	1,012	45.0	-2.1
Other engineering	1,945	1,192	846	804	712	588	673	450	455	330	467	-76.0	2.6

SOURCE: National Science Foundation/SRS. Survey of Graduate Students and Postdoctorates in Science and Engineering.

295

Appendix table 4-21. Graduate students in science and engineering, by field, sex, and race/ethnicity: 1994 and 1995 (U.S. citizens and permanent residents only)

	Year	Total	White	Asian	Black	Hispanic	American Indian	Unknown
					Total			
Total science and engineering	1994	329,391	255,976	26,457	17,665	13,284	1,383	14,626
	1995	325,135	246,776	26,015	18,366	14,089	1,524	18,365
Physical sciences	1994	22,742	18,422	1,925	856	675	67	797
	1995	22,028	17,506	1,797	894	732	78	1,021
Earth, atmospheric, and ocean sciences	1994	12,776	11,351	454	203	344	49	375
	1995	12,866	11,324	423	220	369	53	477
Mathematics	1994	13,496	10,486	1,199	672	369	36	734
	1995	12,688	9,630	1,124	690	400	70	774
Computer sciences	1994	23,200	15,759	4,103	1,216	637	43	1,442
	1995	22,796	14,795	4,103	1,189	660	55	1,994
Agricultural sciences	1994	9,060	7,972	276	239	263	37	273
	1995	9,304	8,013	273	293	289	58	378
Biological sciences	1994	45,274	36,389	3,913	1,709	1,651	183	1,429
	1995	46,455	36,489	4,247	1,879	1,810	214	1,816
Psychology	1994	52,363	42,191	1,586	3,545	2,488	317	2,236
	1995	52,126	40,679	1,596	3,422	2,777	331	3,321
Social sciences	1994	74,415	57,375	3,200	6,442	4,000	409	2,989
	1995	74,830	56,227	3,334	6,907	4,221	434	3,707
Total engineering	1994	76,065	56,031	9,801	2,783	2,857	242	4,351
	1995	72,042	52,113	9,118	2,872	2,831	231	4,877
					Female			
Total science and engineering	1994	133,420	102,182	9,319	9,609	6,109	691	5,510
	1995	134,643	100,253	9,554	10,147	6,726	774	7,189
Physical sciences	1994	6,190	4,677	670	359	231	18	235
	1995	6,059	4,488	623	368	262	19	299
Earth, atmospheric, and ocean sciences	1994	4,476	3,948	157	85	130	23	133
	1995	4,694	4,090	162	103	143	22	174
Mathematics	1994	4,850	3,669	471	331	133	12	234
	1995	4,610	3,419	450	306	157	27	251
Computer sciences	1994	5,728	3,287	1,374	510	161	7	389
	1995	5,606	3,098	1,356	526	162	15	449
Agricultural sciences	1994	3,445	2,970	108	121	121	17	108
	1995	3,581	3,008	124	143	134	29	143
Biological sciences	1994	22,581	17,917	1,921	1,038	884	106	715
	1995	23,331	18,094	2,117	1,190	967	121	842
Psychology	1994	36,830	29,426	1,150	2,691	1,782	220	1,561
	1995	36,902	28,493	1,182	2,589	2,030	237	2,371
Social sciences	1994	36,083	27,065	1,652	3,649	2,071	224	1,422
	1995	36,740	26,611	1,741	4,011	2,240	253	1,884
Total engineering	1994	13,237	9,223	1,816	825	596	64	713
	1995	13,120	8,952	1,799	911	631	51	776

See explanatory information and SOURCES at end of table.

Appendix table 4-21. Graduate students in science and engineering, by field, sex, and race/ethnicity: 1994 and 1995 (U.S. citizens and permanent residents only)

Page 2 of 2

	Year	Total	White	Asian	Black	Hispanic	American Indian	Unknown
	Male							
Total science and engineering	1994	195,971	153,794	17,138	8,056	7,175	692	9,116
	1995	190,492	146,523	16,461	8,219	7,363	750	11,176
Physical sciences	1994	16,552	13,745	1,255	497	444	49	562
	1995	15,969	13,018	1,174	526	470	59	722
Earth, atmospheric, and ocean sciences	1994	8,300	7,403	297	118	214	26	242
	1995	8,172	7,234	261	117	226	31	303
Mathematics	1994	8,646	6,817	728	341	236	24	500
	1995	8,078	6,211	674	384	243	43	523
Computer sciences	1994	17,472	12,472	2,729	706	476	36	1,053
	1995	17,190	11,697	2,747	663	498	40	1,545
Agricultural sciences	1994	5,615	5,002	168	118	142	20	165
	1995	5,723	5,005	149	150	155	29	235
Biological sciences	1994	22,693	18,472	1,992	671	767	77	714
	1995	23,124	18,395	2,130	689	843	93	974
Psychology	1994	15,533	12,765	436	854	706	97	675
	1995	15,224	12,186	414	833	747	94	950
Social sciences	1994	38,332	30,310	1,548	2,793	1,929	185	1,567
	1995	38,090	29,616	1,593	2,896	1,981	181	1,823
Total engineering	1994	62,828	46,808	7,985	1,958	2,261	178	3,638
	1995	58,922	43,161	7,319	1,961	2,200	180	4,101

SOURCE: National Science Foundation/SRS. Survey of Graduate Students and Postdoctorates in Science and Engineering.

Appendix table 4-22. Graduate students with temporary visas enrolled in science and engineering, by field: 1985-1995

Page 1 of 1

Academic discipline	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	Percent change 1985-1995	Percent change 1993-1995
Total science and engineering	76,812	83,975	88,790	93,615	98,083	102,820	108,635	109,516	105,786	102,367	98,787	28.6	-6.6
Total sciences	47,990	52,030	55,413	58,389	61,386	64,621	67,292	68,076	66,519	65,372	63,300	31.9	-4.8
Physical sciences	8,941	10,028	10,628	11,072	11,773	12,466	12,725	12,805	12,252	11,707	11,442	28.0	-6.6
Astronomy	154	163	182	166	164	192	217	225	217	262	232	50.6	6.9
Chemistry	4,371	4,842	5,299	5,659	6,107	6,643	6,898	6,907	6,675	6,412	6,464	47.9	-3.2
Physics	4,394	4,990	5,115	5,201	5,469	5,592	5,570	5,627	5,284	4,945	4,663	6.1	-11.8
Other physical sciences	22	33	32	46	33	39	40	46	76	88	83	277.3	9.2
Earth, atmospheric, and ocean sciences	1,866	2,070	2,190	2,408	2,575	2,675	2,897	3,004	3,010	3,266	2,936	57.3	-2.5
Atmospheric sciences	209	213	239	247	249	281	310	324	297	265	266	27.3	-10.4
Earth sciences	1,026	1,124	1,213	1,316	1,404	1,481	1,535	1,668	1,672	1,750	1,543	50.4	-7.7
Oceanography	345	424	404	465	563	557	609	593	589	721	621	80.0	5.4
Other geosciences	266	309	334	380	359	356	443	419	452	530	506	76.9	11.9
Mathematics and statistics	5,345	5,810	6,129	6,425	6,683	6,564	6,634	6,477	6,134	6,083	5,821	8.9	-5.1
Computer science	7,497	8,058	8,777	8,984	9,694	10,906	11,622	12,155	11,954	11,078	10,713	42.9	-10.4
Biological sciences	9,523	10,591	11,592	12,618	13,711	14,702	15,704	15,997	16,063	16,008	15,420	61.9	-4.0
Agricultural sciences	2,656	2,793	2,914	2,929	2,939	3,183	3,208	3,178	3,136	3,139	3,122	17.5	-0.4
Biological sciences	6,867	7,798	8,678	9,689	10,772	11,519	12,496	12,819	12,927	12,869	12,298	79.1	-4.9
Psychology	1,492	1,502	1,539	1,647	1,631	1,818	1,988	1,961	1,909	2,363	2,117	41.9	10.9
Social sciences	13,326	13,971	14,558	15,235	15,319	15,490	15,722	15,677	15,197	14,867	14,851	11.4	-2.3
Economics	5,464	5,472	5,708	6,088	6,233	6,347	6,482	6,734	6,425	6,318	6,494	18.9	1.1
Political science and public administration	3,175	3,636	3,717	3,720	3,546	3,487	3,608	3,538	3,537	3,418	3,391	6.8	-4.1
Sociology	1,576	1,583	1,701	1,811	1,804	1,820	1,722	1,651	1,551	1,430	1,304	-17.3	-15.9
Anthropology	541	632	662	730	763	791	824	814	800	787	700	29.4	-12.5
Linguistics	1,072	1,093	1,103	1,141	1,177	1,237	1,259	1,097	1,061	1,012	997	-7.0	-6.0
History of science	55	42	43	46	40	44	51	60	55	56	51	-7.3	-7.3
Other social sciences	1,443	1,513	1,624	1,699	1,756	1,764	1,776	1,783	1,768	1,846	1,914	32.6	8.3
Engineering	28,822	31,945	33,377	35,226	36,697	38,199	41,343	41,440	39,267	36,995	35,487	23.1	-9.6
Aerospace engineering	809	872	871	1,110	1,093	1,231	1,228	1,182	1,201	1,239	1,186	46.6	-1.2
Chemical engineering	2,421	2,372	2,486	2,547	2,798	2,944	3,188	3,275	3,168	3,013	2,950	21.9	-6.9
Civil engineering	5,387	5,690	5,587	5,811	5,835	5,914	6,544	6,838	6,264	5,934	5,600	4.0	-10.9
Electrical engineering	8,443	9,544	10,117	10,365	11,148	11,595	12,816	12,833	12,440	11,408	11,308	33.9	-9.1
Mechanical engineering	4,787	5,384	5,511	6,020	5,815	6,080	6,674	6,762	6,278	5,838	5,442	13.7	-13.3
Materials engineering	1,369	1,608	1,693	1,780	1,941	2,115	2,168	2,211	2,162	1,966	1,933	41.2	-10.6
Industrial engineering	1,947	2,165	2,613	2,683	2,918	3,119	3,774	3,843	3,443	3,576	3,317	70.4	-3.7
Other engineering	3,659	4,310	4,499	4,910	5,149	5,201	4,951	4,496	4,291	4,021	3,751	2.5	-12.6

SOURCE: National Science Foundation/SRS. Survey of Graduate Students and Postdoctorates in Science and Engineering.

Appendix table 4-23. U.S. citizen and permanent resident graduate students in science and engineering, by field and race/ethnicity: 1985-1995

Page 1 of 1

Race and ethnicity	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	Percent change 1985-1995	Percent change 1993-1995	Percent proportion 1985	Percent proportion 1995
Total enrollment	358,126	368,119	373,355	375,287	382,769	397,159	412,708	430,797	436,233	431,758	423,922	18.4	-2.8	100.0	100.0
Total U.S. citizens	281,314	284,144	284,565	281,672	284,686	294,339	304,073	321,281	330,447	329,391	325,135	15.6	-1.6	78.6	76.7
Black, non-Hispanic	10,453	10,460	10,426	11,191	11,775	12,774	13,691	15,449	17,147	17,665	18,366	75.7	7.1	2.9	4.3
American Indian or Alaskan Native	737	743	782	918	860	1,054	1,120	1,244	1,312	1,383	1,524	106.8	16.2	0.2	0.4
Asian or Pacific Islander	12,003	12,775	14,565	15,188	15,693	17,156	18,139	21,762	24,149	26,457	26,015	116.7	7.7	3.4	6.1
Hispanic	8,614	8,658	8,823	9,098	9,436	10,159	11,045	12,248	13,386	13,284	14,089	63.6	5.3	2.4	3.3
White, non-Hispanic	223,682	227,547	228,809	229,037	229,694	238,492	243,608	253,516	257,009	255,976	246,776	10.3	-4.0	62.5	58.2
Other/unknown	25,825	23,961	21,160	16,240	17,228	14,704	16,470	17,062	17,444	14,626	18,365	-28.9	5.3	7.2	4.3
Non U.S. citizens	76,812	83,975	88,790	93,615	98,083	102,820	108,635	109,516	105,786	102,367	98,787	28.6	-6.6	21.4	23.3
Total full-time enrollment	234,056	242,841	247,219	250,667	256,928	265,423	277,183	290,654	294,227	293,324	288,016	23.1	-2.1	65.4	67.9
Total U.S. citizens	168,339	170,462	171,183	170,246	173,439	177,825	185,496	197,569	204,630	206,916	204,742	21.6	0.1	47.0	48.3
Black, non-Hispanic	5,580	5,564	5,608	6,060	6,594	7,029	7,692	8,908	9,910	10,357	10,672	91.3	7.7	1.6	2.5
American Indian or Alaskan Native	479	490	519	570	551	655	717	848	899	960	1,064	122.1	18.4	0.1	0.3
Asian or Pacific Islander	7,255	7,896	9,062	9,470	9,820	10,611	11,270	13,326	15,225	17,111	16,805	131.6	10.4	2.0	4.0
Hispanic	5,143	5,238	5,193	5,503	5,924	6,389	6,931	7,597	8,202	8,180	9,057	76.1	10.4	1.4	2.1
White, non-Hispanic	138,071	141,356	140,921	140,947	142,475	146,717	150,945	158,514	161,427	162,903	158,016	14.4	-2.1	38.6	37.3
Other/unknown	11,811	9,918	9,880	7,696	8,075	6,424	7,941	8,376	8,967	7,405	9,128	-22.7	1.8	3.3	2.2
Non U.S. citizens	65,717	72,379	76,036	80,421	83,489	87,598	91,687	93,085	89,597	86,408	83,274	26.7	-7.1	18.4	19.6
Total part-time enrollment	124,070	125,278	126,136	124,620	125,841	131,736	135,525	140,143	142,006	138,434	135,906	9.5	-4.3	34.6	32.1
Total U.S. citizens	112,975	113,682	113,382	111,426	111,247	116,514	118,577	123,712	125,817	122,475	120,393	6.6	-4.3	31.5	28.4
Black, non-Hispanic	4,873	4,896	4,818	5,131	5,181	5,745	5,999	6,541	7,237	7,308	7,694	57.9	6.3	1.4	1.8
American Indian or Alaskan Native	258	253	263	348	309	399	403	396	413	423	460	78.3	11.4	0.1	0.1
Asian or Pacific Islander	4,748	4,879	5,503	5,718	5,873	6,545	6,869	8,436	8,924	9,346	9,210	94.0	3.2	1.3	2.2
Hispanic	3,471	3,420	3,630	3,595	3,512	3,770	4,114	4,651	5,184	5,104	5,032	45.0	-2.9	1.0	1.2
White, non-Hispanic	85,611	86,191	87,888	88,090	87,219	91,775	92,663	95,002	95,582	93,073	88,760	3.7	-7.1	23.9	20.9
Other/unknown	14,014	14,043	11,280	8,544	9,153	8,280	8,529	8,686	8,477	7,221	9,237	-34.1	9.0	3.9	2.2
Non U.S. citizens	11,095	11,596	12,754	13,194	14,594	15,222	16,948	16,431	16,189	15,959	15,513	39.8	-4.2	3.1	3.7

SOURCE: National Science Foundation/SRS. Survey of Graduate Students and Postdoctorates in Science and Engineering.

Appendix table 4-24. Graduate students in science and engineering attending Historically Black Colleges and Universities, by field and race/ethnicity: 1985-1995 (U.S. citizens and permanent residents only)

Page 1 of 2

Academic discipline	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	Percent change 1985-1995	Percent change 1993-1995	Percent proportion 1985	Percent proportion 1995
	All races and ethnicities														
Total science and engineering	2,225	2,100	1,877	2,198	2,295	2,526	2,615	2,778	3,181	3,810	3,834	72.3	20.5	100.0	100.0
Sciences															
Physical sciences	198	182	191	223	226	226	248	231	286	340	375	89.4	31.1	8.9	9.8
Geosciences	18	10	11	28	21	38	48	70	80	64	73	305.6	-8.8	0.8	1.9
Mathematical sciences	320	312	269	322	384	416	436	443	517	522	491	53.4	-5.0	14.4	12.8
Agricultural sciences	45	29	18	14	15	49	60	96	105	136	167	271.1	59.0	2.0	4.4
Biological sciences	345	306	276	301	333	334	339	377	521	570	607	75.9	16.5	15.5	15.8
Psychology	389	408	360	425	403	415	409	479	530	694	573	47.3	8.1	17.5	14.9
Social sciences	799	688	642	716	693	811	812	788	821	1,063	1,089	36.3	32.6	35.9	28.4
Engineering	111	165	110	169	220	237	263	294	321	421	459	313.5	43.0	5.0	12.0
	Black, non-Hispanic														
Total science and engineering	1,587	1,624	1,487	1,671	1,700	1,913	1,959	2,075	2,433	2,768	2,917	83.8	19.9	100.0	100.0
Sciences															
Physical sciences	166	159	160	165	179	174	190	179	211	231	249	50.0	18.0	10.5	8.5
Geosciences	10	3	10	11	3	14	24	30	42	30	38	280.0	-9.5	0.6	1.3
Mathematical sciences	181	216	212	223	230	267	296	311	359	382	349	92.8	-2.8	11.4	12.0
Agricultural sciences	21	22	13	11	10	34	37	70	84	102	130	519.0	54.8	1.3	4.5
Biological sciences	313	272	239	248	273	278	278	306	403	453	492	57.2	22.1	19.7	16.9
Psychology	217	232	196	280	276	313	317	352	428	489	428	97.2	0.0	13.7	14.7
Social sciences	600	632	582	627	587	691	674	650	694	828	937	56.2	35.0	37.8	32.1
Engineering	79	88	75	106	142	142	143	177	212	253	294	272.2	38.7	5.0	10.1
	American Indian or Alaskan Native														
Total science and engineering	2	2	2	1	5	2	2	7	7	5	19	850.0	171.4	100.0	100.0
Sciences															
Physical sciences	1	1	0	1	1	0	1	1	2	2	15	1,400.0	650.0	50.0	78.9
Geosciences	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Mathematical sciences	0	0	0	0	2	0	0	0	0	1	1	N/A	N/A	0.0	5.3
Agricultural sciences	0	0	0	0	0	0	0	2	2	0	0	0.0	-100.0	0.0	0.0
Biological sciences	1	1	1	0	0	0	0	1	2	1	1	0.0	-50.0	50.0	5.3
Psychology	0	0	0	0	1	1	0	1	0	0	0	0.0	0.0	0.0	0.0
Social sciences	0	0	1	0	1	1	1	2	1	1	0	0.0	-100.0	0.0	0.0
Engineering	0	0	0	0	0	0	0	0	0	0	2	N/A	N/A	0.0	10.5
	Asian or Pacific Islander														
Total science and engineering	95	72	56	87	144	154	185	150	165	186	175	84.2	6.1	100.0	100.0
Sciences															
Physical sciences	13	4	3	10	21	17	31	10	25	40	31	138.5	24.0	13.7	17.7
Geosciences	0	0	0	0	0	0	0	4	8	8	5	100.0	-37.5	0.0	2.9
Mathematical sciences	55	42	20	37	64	68	59	66	62	48	51	-7.3	-17.7	57.9	29.1
Agricultural sciences	4	1	0	0	0	5	8	6	4	4	4	0.0	0.0	4.2	2.3
Biological sciences	7	9	6	10	13	20	20	15	31	40	34	385.7	9.7	7.4	19.4
Psychology	0	1	1	4	6	3	8	1	1	2	2	100.0	100.0	0.0	1.1
Social sciences	7	7	15	12	10	10	9	9	9	10	9	28.6	0.0	7.4	5.1
Engineering	9	8	11	14	30	31	50	39	25	34	39	333.3	56.0	9.5	22.3

See explanatory information and SOURCES at end of table.

Appendix table 4-24. Graduate students in science and engineering attending Historically Black Colleges and Universities, by field and race/ethnicity: 1985-1995 (U.S. citizens and permanent residents only)

Page 2 of 2

Academic discipline	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	Percent change 1985B1995	Percent change 1993B1995	Percent proportion 1985	Percent proportion 1995
	Hispanic														
Total science and engineering	24	9	12	22	26	19	23	25	40	41	45	87.5	12.5	100.0	100.0
Sciences															
Physical sciences	2	1	1	2	0	0	1	1	10	9	9	350.0	-10.0	8.3	20.0
Geosciences	3	0	0	0	0	0	0	1	1	1	2	-33.3	100.0	12.5	4.4
Mathematical sciences	6	0	3	2	4	3	2	3	1	7	6	0.0	500.0	25.0	13.3
Agricultural sciences	0	0	1	0	0	1	3	5	4	4	3	100.0	-25.0	0.0	6.7
Biological sciences	5	5	3	5	7	6	8	4	8	9	9	80.0	12.5	20.8	20.0
Psychology	3	1	1	5	7	1	1	2	3	3	3	0.0	0.0	12.5	6.7
Social sciences	4	1	1	3	4	5	6	4	3	5	3	-25.0	0.0	16.7	6.7
Engineering	1	1	2	5	4	3	2	5	10	3	10	900.0	0.0	4.2	22.2
	White, non-Hispanic														
Total science and engineering	296	300	262	306	318	353	378	427	429	665	536	81.1	24.9	100.0	100.0
Sciences															
Physical sciences	11	7	9	11	19	29	21	35	24	43	44	300.0	83.3	3.7	8.2
Geosciences	5	7	1	17	18	22	19	31	25	20	28	460.0	12.0	1.7	5.2
Mathematical sciences	70	46	28	33	46	50	54	35	51	57	70	0.0	37.3	23.6	13.1
Agricultural sciences	2	6	4	3	5	9	12	8	5	15	15	650.0	200.0	0.7	2.8
Biological sciences	14	14	21	35	33	30	32	38	55	52	48	242.9	-12.7	4.7	9.0
Psychology	151	169	141	130	97	81	77	118	93	200	139	-7.9	49.5	51.0	25.9
Social sciences	21	22	36	40	60	77	105	104	111	178	112	433.3	0.9	7.1	20.9
Engineering	22	29	22	37	40	55	58	58	65	100	80	263.6	23.1	7.4	14.9
	Other/Unknown races and ethnicities														
Total science and engineering	221	93	58	111	102	85	68	94	107	145	142	-35.7	32.7	100.0	100.0
Sciences															
Physical sciences	5	10	18	34	6	6	4	5	14	15	27	440.0	92.9	2.3	19.0
Geosciences	0	0	0	0	0	2	5	4	4	5	0	0.0	-100.0	0.0	0.0
Mathematical sciences	8	8	6	27	38	28	25	28	44	27	14	75.0	-68.2	3.6	9.9
Agricultural sciences	18	0	0	0	0	0	0	5	6	11	15	-16.7	150.0	8.1	10.6
Biological sciences	5	5	6	3	7	0	1	13	22	15	23	360.0	4.5	2.3	16.2
Psychology	18	5	21	6	16	16	6	5	5	0	1	-94.4	-80.0	8.1	0.7
Social sciences	167	26	7	34	31	27	17	19	3	41	28	-83.2	833.3	75.6	19.7
Engineering	0	39	0	7	4	6	10	15	9	31	34	N/A	277.8	0.0	23.9

SOURCE: National Science Foundation/SRS. Survey of Graduate Students and Postdoctorates in Science and Engineering.

Appendix table 4-25. Graduate enrollment, by disability status and field: 1996

[Percentage distribution]

Page 1 of 1

	Total	Social/ behavioral sciences	Life and physical sciences	Engineering/ computer science/math	Humanities	Education	Business/ management	Health	Law	Other	Missing/ undeclared
Percentage											
Total (N=2,464,000)	100	8.3	6.7	8.8	8.7	27.8	18.1	7.7	0.4	3.1	10.3
Students without disabilities (N=2,338,000)	100	8.5	6.9	8.9	8.7	28.1	18.2	7.2	0.4	3.0	10.2
Students with disabilities (N=82,000)	100	6.0	2.2	3.8	5.9	24.8	15.3	25.4	0.3	4.0	12.3
Standard errors											
Total		0.86	0.97	1.00	1.29	1.64	1.57	1.04	0.13	0.57	1.12
Students without disabilities		0.90	0.99	1.02	1.33	1.70	1.62	0.99	0.14	0.54	1.18
Students with disabilities		2.11	1.48	2.07	2.15	5.70	4.56	8.23	0.20	2.62	4.98

NOTE: Because of rounding, details may not add to totals.

SOURCE: U.S. Department of Education/NCES. 1995-96 National Postsecondary Student Aid Study. Data analysis system.

Appendix table 4-26. Total degrees awarded in all fields, by degree level and sex of recipient: 1966-1995

Page 1 of 1

Year	Bachelor's			Master's			Doctoral		
	Men	Women	Percent women	Men	Women	Percent women	Men	Women	Percent women
1966	301,037	222,971	42.6	93,184	47,588	33.8	15,863	2,086	11.6
1967	324,236	238,133	42.3	103,179	54,713	34.7	17,961	2,442	12.0
1968	359,747	277,116	43.5	113,749	63,401	35.8	20,005	2,932	12.8
1969	412,865	321,138	43.8	121,881	72,533	37.3	22,355	3,388	13.2
1970	453,605	344,465	43.2	126,146	83,241	39.8	25,527	3,971	13.5
1971	478,423	367,687	43.5	138,590	92,896	40.1	27,271	4,596	14.4
1972	503,631	390,479	43.7	150,085	102,689	40.6	27,754	5,287	16.0
1973	521,534	408,738	43.9	155,000	109,525	41.4	27,670	6,085	18.0
1974	530,907	423,469	44.4	158,344	119,915	43.1	26,594	6,453	19.5
1975	508,424	423,239	45.4	162,115	131,536	44.8	25,751	7,201	21.9
1976	508,549	425,894	45.6	167,745	145,256	46.4	25,262	7,684	23.3
1977	499,121	429,107	46.2	168,210	150,031	47.1	23,858	7,858	24.8
1978	491,066	439,135	47.2	161,708	151,108	48.3	22,553	8,322	27.0
1979	481,394	449,946	48.3	153,772	148,303	49.1	22,302	8,937	28.6
1980	477,750	462,501	49.2	151,159	147,936	49.5	21,612	9,408	30.3
1981	474,336	472,541	49.9	147,431	149,367	50.3	21,464	9,892	31.5
1982	477,543	486,500	50.5	145,941	150,639	50.8	21,018	10,093	32.4
1983	483,395	497,284	50.7	145,114	145,817	50.1	20,748	10,533	33.7
1984	486,750	499,595	50.7	143,998	141,464	49.6	20,638	10,699	34.1
1985	486,660	504,217	50.9	143,716	143,497	50.0	20,553	10,744	34.3
1986	490,143	510,061	51.0	143,932	145,897	50.3	20,595	11,307	35.4
1987	485,003	518,529	51.7	141,655	148,877	51.2	20,938	11,432	35.3
1988	481,236	524,797	52.2	145,403	154,688	51.5	21,682	11,819	35.3
1989	487,566	542,605	52.7	149,399	161,651	52.0	21,813	12,513	36.5
1990	495,867	566,284	53.3	154,025	170,922	52.6	22,962	13,105	36.3
1991	508,952	599,045	54.1	156,895	181,603	53.6	23,652	13,870	37.0
1992	525,395	624,677	54.3	162,299	191,908	54.2	24,436	14,420	37.1
1993	537,536	641,742	54.4	169,753	201,220	54.2	24,658	15,113	38.0
1994	537,061	646,080	54.6	176,762	212,246	54.6	25,211	15,806	38.5
1995	531,146	643,290	54.8	179,198	220,230	55.1	25,277	16,333	39.3

SOURCES: Tabulations by National Science Foundation/SRS; data from Department of Education/National Center for Education Statistics Survey Center for Education Statistics Survey of Degrees and Other Formal Awards Conferred, and Completions Survey; and NSF/SRS, Survey of Earned Doctorates.

Appendix table 4-27. Science and engineering degrees awarded, by degree level and sex of recipient: 1966-1995

Page 1 of 1

Year	Bachelor's			Master's			Doctoral		
	Men	Women	Percent women	Men	Women	Percent women	Men	Women	Percent women
1966	138,679	45,634	24.8	35,580	5,469	13.3	10,646	924	8.0
1967	149,045	50,787	25.4	38,682	6,306	14.0	12,013	1,096	8.4
1968	165,200	61,397	27.1	41,551	7,209	14.8	13,328	1,317	9.0
1969	189,272	72,917	27.8	44,182	8,200	15.7	14,781	1,507	9.3
1970	204,528	79,702	28.0	43,973	9,722	18.1	16,404	1,648	9.1
1971	209,318	85,039	28.9	46,116	10,338	18.3	17,385	1,996	10.3
1972	216,422	90,037	29.4	48,721	11,328	18.9	17,191	2,151	11.1
1973	225,090	95,995	29.9	50,233	11,813	19.0	16,853	2,520	13.0
1974	223,652	102,578	31.4	49,528	12,711	20.4	16,043	2,671	14.3
1975	210,741	102,814	32.8	49,410	13,788	21.8	15,870	2,929	15.6
1976	205,570	103,921	33.6	49,992	15,015	23.1	15,375	3,097	16.8
1977	198,805	104,993	34.6	50,899	16,498	24.5	14,775	3,233	18.0
1978	195,888	107,667	35.5	50,034	17,230	25.6	14,199	3,454	19.6
1979	193,247	109,915	36.3	46,614	17,612	27.4	14,128	3,744	20.9
1980	191,215	113,480	37.2	46,004	18,085	28.2	13,814	3,961	22.3
1981	190,977	115,815	37.8	45,505	18,861	29.3	14,056	4,201	23.0
1982	193,624	121,399	38.5	46,557	20,011	30.1	13,925	4,350	23.8
1983	194,380	123,191	38.8	46,734	20,999	31.0	13,920	4,715	25.3
1984	199,150	125,134	38.6	47,049	21,533	31.4	13,956	4,792	25.6
1985	203,402	128,871	38.8	48,247	22,331	31.6	14,044	4,891	25.8
1986	204,743	130,662	39.0	48,621	23,219	32.3	14,270	5,167	26.6
1987	199,981	131,545	39.7	48,759	23,844	32.8	14,582	5,312	26.7
1988	191,549	130,933	40.6	49,820	23,835	32.4	15,271	5,662	27.0
1989	189,338	133,483	41.3	50,845	25,580	33.5	15,622	6,109	28.1
1990	189,082	140,012	42.5	51,230	26,558	34.1	16,498	6,369	27.9
1991	189,328	148,347	43.9	50,441	27,927	35.6	17,088	6,931	28.9
1992	195,779	159,486	44.9	52,157	28,950	35.7	17,593	7,080	28.7
1993	200,315	165,720	45.3	55,454	30,971	35.8	17,789	7,652	30.1
1994	202,284	170,977	45.8	57,970	33,441	36.6	18,283	7,919	30.2
1995	202,217	175,931	46.5	58,518	33,791	38.0	18,242	8,273	31.2

SOURCES: Tabulations by National Science Foundation/SRS; data from Department of Education/National Center for Education Statistics Survey of Degrees and Other Formal Awards Conferred, and Completions Survey; and NSF/SRS, Survey of Earned Doctorates.

Women, Minorities and Persons With Disabilities in Science and Engineering: 1998

Appendix table 4-28. Non-science and -engineering degrees awarded, by degree level and sex of recipient: 1966–1995

Page 1 of 1

Year	Bachelor's			Master's			Doctoral		
	Men	Women	Percent women	Men	Women	Percent women	Men	Women	Percent women
1966	162,358	177,337	52.2	57,604	42,119	42.2	5,217	1,162	18.2
1967	175,191	187,346	51.7	64,497	48,407	42.9	5,948	1,346	18.5
1968	194,547	215,719	52.6	72,198	56,192	43.8	6,677	1,615	19.5
1969	223,593	248,221	52.6	77,699	64,333	45.3	7,574	1,881	19.9
1970	249,077	264,763	51.5	82,173	73,519	47.2	9,123	2,323	20.3
1971	269,105	282,648	51.2	92,474	82,558	47.2	9,886	2,600	20.8
1972	287,209	300,442	51.1	101,364	91,361	47.4	10,563	3,136	22.9
1973	296,444	312,743	51.3	104,767	97,712	48.3	10,817	3,565	24.8
1974	307,255	320,891	51.1	108,816	107,204	49.6	10,551	3,782	26.4
1975	297,683	320,425	51.8	112,705	117,748	51.1	9,881	4,272	30.2
1976	302,979	321,973	51.5	117,753	130,241	52.5	9,887	4,587	31.7
1977	300,316	324,114	51.9	117,311	133,533	53.2	9,083	4,625	33.7
1978	295,178	331,468	52.9	111,674	133,878	54.5	8,354	4,868	36.8
1979	288,147	340,031	54.1	107,158	130,691	54.9	8,174	5,193	38.8
1980	286,535	349,021	54.9	105,155	129,851	55.3	7,798	5,447	41.1
1981	283,359	356,726	55.7	101,926	130,506	56.1	7,408	5,691	43.4
1982	283,919	365,101	56.3	99,384	130,628	56.8	7,093	5,743	44.7
1983	289,015	374,093	56.4	98,380	124,818	55.9	6,828	5,818	46.0
1984	287,600	374,461	56.6	96,949	119,931	55.3	6,682	5,907	46.9
1985	283,258	375,346	57.0	95,469	121,166	55.9	6,509	5,853	47.3
1986	285,400	379,399	57.1	95,311	122,678	56.3	6,325	6,140	49.3
1987	285,022	386,984	57.6	92,896	125,033	57.4	6,356	6,120	49.1
1988	289,687	393,864	57.6	95,583	130,853	57.8	6,411	6,157	49.0
1989	298,228	409,122	57.8	98,554	136,071	58.0	6,191	6,404	50.8
1990	306,785	426,272	58.1	102,795	144,364	58.4	6,464	6,736	51.0
1991	319,624	450,698	58.5	106,454	153,676	59.1	6,564	6,939	51.4
1992	329,616	465,191	58.5	110,142	162,958	59.7	6,843	7,340	51.8
1993	337,221	476,022	58.5	114,299	170,249	59.8	6,869	7,461	52.1
1994	334,777	475,103	58.7	118,792	178,805	60.1	6,928	7,887	53.2
1995	328,929	467,359	58.7	120,680	184,439	60.4	7,035	8,060	53.4

SOURCES: Tabulations by National Science Foundation/SRS; data from Department of Education/National Center for Education Statistics Survey of Degrees and Other Formal Awards Conferred, and Completions Survey; and NSF/SRS, Survey of Earned Doctorates.

Appendix table 4-29. Total master's degree recipients, by major field group and sex: 1985-1995

Sex and year	All fields	Science and engineering fields								All other fields
		Total	Engineering	Physical sciences	Earth, atmos, and ocean sciences	Mathematical/ computer sciences	Biological/ agricultural sciences	Psychology	Social sciences	
Both sexes:										
1985	287,213	70,578	20,972	3,605	2,160	10,004	8,208	8,481	17,148	216,635
1986	289,829	71,840	21,096	3,649	2,234	11,254	8,023	8,363	17,221	217,989
1987	290,532	72,603	22,070	3,574	2,051	11,808	7,775	8,165	17,160	217,929
1988	300,091	73,655	22,726	3,708	1,920	12,600	7,556	7,925	17,220	226,436
1989	311,050	76,425	23,743	3,876	1,819	12,829	7,523	8,652	17,983	234,625
1990	324,947	77,788	23,995	3,805	1,596	13,327	7,527	9,308	18,230	247,159
1991	338,498	78,368	24,013	3,777	1,499	12,956	7,406	9,802	18,915	260,130
1992	354,207	81,107	25,018	3,922	1,425	13,320	7,885	9,852	19,685	273,100
1993	370,973	86,425	27,664	3,965	1,397	14,100	8,112	10,412	20,775	284,548
1994	389,008	91,411	28,717	4,263	1,418	14,350	8,686	11,572	22,405	297,597
1995	399,428	94,309	28,630	4,241	1,483	14,495	9,069	13,132	23,259	305,119
Men:										
1985	143,716	48,247	18,728	2,775	1,639	6,951	4,881	3,064	10,209	95,469
1986	143,932	48,621	18,696	2,736	1,717	7,724	4,679	2,937	10,132	95,311
1987	141,655	48,759	19,300	2,684	1,531	8,011	4,437	2,838	9,958	92,896
1988	145,403	49,820	19,918	2,817	1,433	8,759	4,312	2,599	9,982	95,583
1989	149,399	50,845	20,661	2,836	1,337	8,833	4,210	2,814	10,154	98,554
1990	154,025	51,230	20,726	2,754	1,218	9,176	4,080	3,025	10,251	102,795
1991	156,895	50,441	20,656	2,703	1,116	8,709	3,975	2,994	10,288	106,454
1992	162,299	52,157	21,349	2,834	1,057	9,199	4,227	2,929	10,562	110,142
1993	169,753	55,454	23,570	2,794	1,006	9,773	4,381	2,928	11,002	114,299
1994	176,762	57,970	24,294	3,030	994	10,128	4,515	3,287	11,722	118,792
1995	179,198	58,518	23,998	2,958	1,032	10,130	4,740	3,735	11,925	120,680
Women										
1985	143,497	22,331	2,244	830	521	3,053	3,327	5,417	6,939	121,166
1986	145,897	23,219	2,400	913	517	3,530	3,344	5,426	7,089	122,678
1987	148,877	23,844	2,770	890	520	3,797	3,338	5,327	7,202	125,033
1988	154,688	23,835	2,808	891	487	3,841	3,244	5,326	7,238	130,853
1989	161,651	25,580	3,082	1,040	482	3,996	3,313	5,838	7,829	136,071
1990	170,922	26,558	3,269	1,051	378	4,151	3,447	6,283	7,979	144,364
1991	181,603	27,927	3,357	1,074	383	4,247	3,431	6,808	8,627	153,676
1992	191,908	28,950	3,669	1,088	368	4,121	3,658	6,923	9,123	162,958
1993	201,220	30,971	4,094	1,171	391	4,327	3,731	7,484	9,773	170,249
1994	212,246	33,441	4,423	1,233	424	4,222	4,171	8,285	10,683	178,805
1995	220,230	35,791	4,632	1,283	451	4,365	4,329	9,397	11,334	184,439
Percent women:										
1985	50.0	31.6	10.7	23.0	24.1	30.5	40.5	63.9	40.5	55.9
1986	50.3	32.3	11.4	25.0	23.1	31.4	41.7	64.9	41.2	56.3
1987	51.2	32.8	12.6	24.9	25.4	32.2	42.9	65.2	42.0	57.4
1988	51.5	32.4	12.4	24.0	25.4	30.5	42.9	67.2	42.0	57.8
1989	52.0	33.5	13.0	26.8	26.5	31.1	44.0	67.5	43.5	58.0
1990	52.6	34.1	13.6	27.6	23.7	31.1	45.8	67.5	43.8	58.4
1991	53.6	35.6	14.0	28.4	25.6	32.8	46.3	69.5	45.6	59.1
1992	54.2	35.7	14.7	27.7	25.8	30.9	46.4	70.3	46.3	59.7
1993	54.2	35.8	14.8	29.5	28.0	30.7	46.0	71.9	47.0	59.8
1994	54.6	36.6	15.4	28.9	29.9	29.4	48.0	71.6	47.7	60.1
1995	55.0	38.0	16.0	30.0	30.0	30.0	48.0	72.0	49.0	60.0

SOURCES: Tabulations by National Science Foundation/SRS; data from U.S. Department of Education/NCES Survey of Degrees and Other Formal Awards Conferred, and Completions Survey.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 4-30. Total doctorate recipients, by field, citizenship status, and race/ethnicity of U.S. citizens and permanent residents: 1985-1995

Page 1 of 3

Academic discipline	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Total, all recipients: [1]											
Total science and engineering	18,935	19,437	19,894	20,933	21,731	22,867	24,019	24,673	25,441	26,202	26,515
Sciences	15,769	16,061	16,182	16,746	17,188	17,973	18,804	19,235	19,743	20,380	20,508
Physical science	2,934	3,120	3,238	3,350	3,261	3,524	3,625	3,780	3,699	3,977	3,840
Earth, atmospheric, and ocean science	599	559	602	695	723	738	815	794	771	824	778
Mathematical science	688	729	740	749	859	892	1,039	1,058	1,146	1,118	1,190
Computer science	310	399	450	515	612	705	800	869	880	903	998
Agricultural science	1,110	997	976	1,015	1,086	1,174	1,073	1,063	968	1,078	1,036
Biological science	3,793	3,807	3,839	4,112	4,115	4,327	4,646	4,798	5,091	5,200	5,370
Psychology	3,118	3,126	3,173	3,074	3,208	3,281	3,250	3,263	3,419	3,380	3,419
Social science	3,217	3,324	3,164	3,236	3,324	3,332	3,556	3,610	3,769	3,900	3,877
Engineering	3,166	3,376	3,712	4,187	4,543	4,894	5,215	5,438	5,698	5,822	6,007
Non-science and -engineering	12,362	12,465	12,476	12,568	12,595	13,200	13,503	14,183	14,330	14,815	15,095
Grand total	31,297	31,902	32,370	33,501	34,326	36,067	37,522	38,856	39,771	41,017	41,610
U.S. citizens and permanent residents, total:											
Total science and engineering	14,065	14,016	14,055	14,499	14,591	15,363	15,909	15,940	16,570	18,184	18,961
Sciences	12,471	12,290	12,142	12,353	12,362	13,017	13,435	13,420	13,873	15,131	15,625
Physical science	2,187	2,166	2,242	2,258	2,131	2,341	2,299	2,356	2,330	2,789	2,840
Earth, atmospheric, and ocean science	465	427	435	520	547	535	618	541	504	613	593
Mathematical science	418	402	396	386	428	422	518	507	590	657	771
Computer science	213	249	275	326	396	403	451	489	509	543	617
Agricultural science	726	626	632	610	651	687	620	573	506	616	598
Biological science	3,256	3,241	3,141	3,323	3,299	3,379	3,521	3,567	3,751	4,085	4,321
Psychology	2,864	2,832	2,806	2,729	2,737	2,992	3,018	2,986	3,159	3,137	3,169
Social science	2,342	2,347	2,215	2,201	2,173	2,258	2,390	2,401	2,524	2,691	2,716
Engineering	1,594	1,726	1,913	2,146	2,229	2,346	2,474	2,520	2,697	3,053	3,336
Non-science and -engineering	10,629	10,503	10,507	10,414	10,435	11,240	11,509	12,016	12,105	12,693	12,949
Grand total	24,694	24,519	24,562	24,913	25,026	26,603	27,418	27,956	28,675	30,877	31,910
White, non-Hispanic											
Total science and engineering	12,169	12,151	12,052	12,456	12,501	13,170	13,323	13,326	13,735	13,890	13,879
Sciences	10,981	10,797	10,594	10,801	10,775	11,330	11,486	11,446	11,710	11,870	11,793
Physical science	1,906	1,875	1,956	1,948	1,828	2,008	1,968	1,973	1,911	2,025	1,921
Earth, atmospheric, and ocean science	425	397	394	480	498	494	557	485	455	504	464
Mathematical science	350	343	319	332	369	372	419	425	476	479	535
Computer science	177	194	229	265	319	339	355	378	410	401	453
Agricultural science	659	557	554	518	570	601	545	493	438	487	473
Biological science	2,913	2,888	2,759	2,966	2,904	2,975	3,041	3,068	3,146	3,108	3,116
Psychology	2,591	2,548	2,516	2,445	2,453	2,648	2,652	2,636	2,805	2,731	2,715
Social science	1,960	1,995	1,867	1,847	1,834	1,893	1,949	1,988	2,069	2,135	2,116
Engineering	1,188	1,354	1,458	1,655	1,726	1,840	1,837	1,880	2,025	2,020	2,086
Non-science and -engineering	9,137	9,085	9,070	9,005	9,069	9,709	9,856	10,273	10,292	10,695	10,729
Grand total	21,306	21,236	21,122	21,461	21,570	22,879	23,179	23,599	24,027	24,585	24,608

See explanatory information and SOURCES at end of table.

Appendix table 4-30. Total doctorate recipients, by field, citizenship status, and race/ethnicity of U.S. citizens and permanent residents : 1985-1995

Academic discipline	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Asian:											
Total science and engineering	809	816	925	916	986	1,009	1,180	1,344	1,610	2,989	3,666
Sciences	528	554	598	584	625	650	775	893	1,083	2,122	2,635
Physical science	152	147	143	138	156	164	172	226	265	600	751
Earth, atmospheric, and ocean science	19	14	18	14	23	15	17	27	22	89	104
Mathematical science	33	28	41	33	24	27	57	52	79	142	208
Computer science	17	37	26	44	52	48	66	86	77	117	138
Agricultural science	24	22	38	30	23	32	24	37	29	72	78
Biological science	151	168	170	171	201	200	261	269	370	720	924
Psychology	44	42	48	47	55	53	59	59	73	109	121
Social science	88	96	114	107	91	111	119	137	168	273	311
Engineering	281	262	327	332	361	359	405	451	527	867	1,031
Non-science and -engineering	261	245	243	319	282	297	351	417	402	556	634
Grand total	1,070	1,061	1,168	1,235	1,268	1,306	1,531	1,761	2,012	3,545	4,300
Black, non-Hispanic:											
Total science and engineering	374	339	319	361	366	373	459	407	468	496	557
Sciences	340	315	294	330	333	333	404	358	418	442	486
Physical science	27	27	20	34	31	30	31	25	41	46	43
Earth, atmospheric, and ocean science	4	0	2	3	4	3	3	6	4	6	3
Mathematical science	7	6	11	4	8	4	11	4	8	11	5
Computer science	3	1	2	2	1	1	8	5	6	10	11
Agricultural science	16	16	13	20	14	15	17	14	16	22	17
Biological science	53	48	60	48	56	50	60	61	74	75	105
Psychology	105	111	93	105	97	115	130	106	119	124	150
Social science	125	106	93	114	122	115	144	137	150	148	152
Engineering	34	24	25	31	33	40	55	49	50	54	71
Non-science and -engineering	669	617	591	609	596	676	701	706	809	778	898
Grand total	1,043	956	910	970	962	1,049	1,160	1,113	1,277	1,274	1,455
American Indian:											
Total science and engineering	41	52	53	44	53	43	56	69	43	64	69
Sciences	40	46	46	40	46	39	50	58	41	58	59
Physical science	3	5	7	6	10	3	10	12	5	6	9
Earth, atmospheric, and ocean science	1	2	0	2	6	1	3	1	4	1	0
Mathematical science	0	1	0	2	0	1	0	2	1	2	2
Computer science	0	0	3	1	2	0	1	2	1	1	0
Agricultural science	4	0	2	6	2	4	4	0	1	1	2
Biological science	13	17	11	6	7	4	10	13	7	16	15
Psychology	10	9	16	7	11	19	13	15	15	12	14
Social science	9	12	7	10	8	7	9	13	7	19	17
Engineering	1	6	7	4	7	4	6	11	2	6	10
Non-science and -engineering	55	47	62	50	41	54	76	80	77	78	79
Grand total	96	99	115	94	94	97	132	149	120	142	148

See explanatory information and SOURCES at end of table.

Appendix table 4-30. Total doctorate recipients, by field, citizenship status, and race/ethnicity of U.S. citizens and permanent residents : 1985-1995

Page 3 of 3

Academic discipline	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Hispanic:											
Total science and engineering	296	345	357	397	382	468	492	513	542	548	568
Sciences	274	310	323	334	335	414	432	442	476	482	491
Physical science	30	41	56	63	59	72	65	72	79	90	73
Earth, atmospheric, and ocean science	6	4	5	7	9	13	16	16	13	8	12
Mathematical science	12	12	11	4	11	10	9	12	16	13	15
Computer science	6	7	4	2	4	5	12	8	7	7	6
Agricultural science	12	17	15	21	18	23	15	18	20	25	21
Biological science	59	66	62	76	71	89	95	102	114	131	126
Psychology	69	90	95	93	93	109	122	133	131	133	145
Social science	80	73	75	68	70	93	98	81	96	75	93
Engineering	22	35	34	63	47	54	60	71	66	66	77
Non-science and -engineering	338	334	351	296	312	369	375	396	431	481	487
Grand total	634	679	708	693	694	837	867	909	973	1,029	1,055
U.S. citizens and permanent residents, unknown race/ethnicity											
Total science and engineering	376	313	349	325	303	300	399	281	172	197	222
Sciences	308	268	287	264	248	251	288	223	145	157	161
Physical science	69	71	60	69	47	64	53	48	29	22	43
Earth, atmospheric, and ocean science	10	10	16	14	7	9	22	6	6	5	10
Mathematical science	16	12	14	11	16	8	22	12	10	10	6
Computer science	10	10	11	12	18	10	9	10	8	7	9
Agricultural science	11	14	10	15	24	12	15	11	2	9	7
Biological science	67	54	79	56	60	61	54	54	40	35	35
Psychology	45	32	38	32	28	48	42	37	16	28	24
Social science	80	65	59	55	48	39	71	45	34	41	27
Engineering	68	45	62	61	55	49	111	58	27	40	61
Non-science and -engineering	169	175	190	135	135	135	150	144	94	105	122
Grand total	545	488	539	460	438	435	549	425	266	302	344
Nonresident alien: [2]											
Total science and engineering	4,047	4,160	4,468	4,936	5,391	6,571	7,642	8,092	8,113	7,521	6,992
Sciences	2,628	2,788	2,936	3,215	3,451	4,294	5,008	5,349	5,329	4,868	4,469
Physical science	624	767	801	870	890	1,073	1,257	1,346	1,263	1,107	930
Earth, atmospheric, and ocean science	115	97	122	132	122	171	185	236	235	197	172
Mathematical science	238	272	302	305	346	424	506	511	517	448	382
Computer science	89	123	143	176	178	271	340	365	348	343	365
Agricultural science	354	320	289	345	355	440	435	472	447	453	429
Biological science	424	391	492	557	608	853	1,059	1,159	1,246	1,058	971
Psychology	81	81	85	84	106	117	133	156	148	151	162
Social science	703	737	702	746	846	945	1,093	1,104	1,125	1,111	1,058
Engineering	1,419	1,372	1,532	1,721	1,940	2,277	2,634	2,743	2,784	2,653	2,523
Non-science and -engineering	1,180	1,116	1,144	1,259	1,257	1,522	1,670	1,861	1,821	1,885	1,814
Grand total	5,227	5,276	5,612	6,195	6,648	8,093	9,312	9,953	9,934	9,406	8,806

[1] Total includes persons of unknown citizenship.
[2] Nonresident aliens include foreign citizens on temporary visas only.

SOURCE: National Science Foundation/SRS, Survey of Earned Doctorates.

Appendix table 4-31. Total doctorate recipients, by major field and sex: 1985-1995

Page 1 of 1

Year	Total, Science and Engineering	Engineering	Sciences: Total sciences	Physical sciences	Earth, atmospheric, and ocean sciences	Mathematics	Computer science	Biological/ agricultural sciences	Psychology	Social sciences	NonS&E, total	Grand total, all fields
Total												
1985	18,935	3,166	15,769	2,934	599	688	310	4,903	3,118	3,217	12,362	31,297
1986	19,437	3,376	16,061	3,120	559	729	399	4,804	3,126	3,324	12,465	31,902
1987	19,894	3,712	16,182	3,238	602	740	450	4,815	3,173	3,164	12,476	32,370
1988	20,933	4,187	16,746	3,350	695	749	515	5,127	3,074	3,236	12,568	33,501
1989	21,731	4,543	17,188	3,261	723	859	612	5,201	3,208	3,324	12,595	34,326
1990	22,867	4,894	17,973	3,524	738	892	705	5,501	3,281	3,332	13,200	36,067
1991	24,019	5,215	18,804	3,625	815	1,039	800	5,719	3,250	3,556	13,503	37,522
1992	24,673	5,438	19,235	3,780	794	1,058	869	5,861	3,263	3,610	14,183	38,856
1993	25,441	5,698	19,743	3,699	771	1,146	880	6,059	3,419	3,769	14,330	39,771
1994	26,202	5,822	20,380	3,977	824	1,118	903	6,278	3,380	3,900	14,815	41,017
1995	26,515	6,007	20,508	3,840	778	1,190	998	6,406	3,419	3,877	15,095	41,610
Women												
1985	4,891	198	4,693	467	108	106	33	1,409	1,541	1,029	5,853	10,744
1986	5,167	225	4,942	510	95	121	48	1,452	1,599	1,117	6,140	11,307
1987	5,312	242	5,070	528	112	125	65	1,531	1,698	1,011	6,120	11,432
1988	5,662	286	5,376	567	135	121	56	1,691	1,681	1,125	6,157	11,819
1989	6,109	375	5,734	619	148	155	108	1,769	1,800	1,135	6,404	12,513
1990	6,369	415	5,954	661	141	158	110	1,860	1,913	1,111	6,736	13,105
1991	6,931	467	6,464	679	179	199	117	1,981	1,996	1,313	6,939	13,870
1992	7,080	506	6,574	770	188	205	120	2,064	1,928	1,299	7,340	14,420
1993	7,652	522	7,130	780	160	264	138	2,278	2,088	1,422	7,461	15,113
1994	7,919	635	7,284	828	183	236	137	2,355	2,102	1,443	7,887	15,806
1995	8,273	694	7,579	878	170	265	186	2,442	2,172	1,466	8,060	16,333
Women as a percent of total												
1985	25.8	6.3	29.8	15.9	18.0	15.4	10.6	28.7	49.4	32.0	47.3	34.3
1986	26.6	6.7	30.8	16.3	17.0	16.6	12.0	30.2	51.2	33.6	49.3	35.4
1987	26.7	6.5	31.3	16.3	18.6	16.9	14.4	31.8	53.5	32.0	49.1	35.3
1988	27.0	6.8	32.1	16.9	19.4	16.2	10.9	33.0	54.7	34.8	49.0	35.3
1989	28.1	8.3	33.4	19.0	20.5	18.0	17.6	34.0	56.1	34.1	50.8	36.5
1990	27.9	8.5	33.1	18.8	19.1	17.7	15.6	33.8	58.3	33.3	51.0	36.3
1991	28.9	9.0	34.4	18.7	22.0	19.2	14.6	34.6	61.4	36.9	51.4	37.0
1992	28.7	9.3	34.2	20.4	23.7	19.4	13.8	35.2	59.1	36.0	51.8	37.1
1993	30.1	9.2	36.1	21.1	20.8	23.0	15.7	37.6	61.1	37.7	52.1	38.0
1994	30.2	10.9	35.7	20.8	22.2	21.1	15.2	37.5	62.2	37.0	53.2	38.5
1995	31.2	11.6	37.0	22.9	21.9	22.3	18.6	38.1	63.5	37.8	53.4	39.3

[1] NonS&E doctorates include those whose field of specialization is unknown.

NOTES: Categories differ from those published by other Federal sponsors and the National Research Council because linguistics, history of science, American studies, and archaeology are included in social sciences rather than in humanities.

SOURCE: National Science Foundation/SRS, Survey of Eamed Doctorates 1995.

Appendix table 4-32. Total doctorate recipients, by detailed field and sex: 1995

Field of study	Total	Men	Women	Percent women
Science and engineering, total	26,515	18,242	8,273	31.2
Engineering, total	6,007	5,313	694	11.6
Aeronautical/astronautical engineering	251	237	14	5.6
Chemical engineering	708	599	109	15.4
Chemical	602	506	96	15.9
Petroleum	48	47	1	2.1
Polymer/plastics	58	46	12	20.7
Civil engineering	656	580	76	11.6
Civil	572	517	55	9.6
Environmental health	84	63	21	25.0
Electrical engineering	1,731	1,558	173	10.0
Communications	29	24	5	17.2
Computer	189	171	18	9.5
Electrical/electronics	1,513	1,363	150	9.9
Industrial/manufacturing engineering	283	233	50	17.7
Materials/metallurgical engineering	588	494	94	16.0
Ceramic sciences	39	34	5	12.8
Materials science	476	392	84	17.6
Metallurgical	73	68	5	6.8
Mechanical engineering	1,024	961	63	6.2
Mechanical	916	861	55	6.0
Engineering mechanics	108	100	8	7.4
Other engineering	766	651	115	15.0
Agricultural	73	66	7	9.6
Bioengineering/biomedical	189	141	48	25.4
Engineering physics	17	16	1	5.9
Engineering science	56	50	6	10.7
Mining/mineral	19	19	0	0.0
Nuclear	105	96	9	8.6
Ocean	21	18	3	14.3
Operations research	48	40	8	16.7
Systems	47	42	5	10.6
Engineering, general	60	51	9	15.0
Engineering, other	131	112	19	14.5
Sciences, total	20,508	12,929	7,579	37.0
Physical sciences, total	3,840	2,962	878	22.9
Astronomy	173	143	30	17.3
Astronomy	89	71	18	20.2
Astrophysics	84	72	12	14.3
Chemistry	2,161	1,500	661	30.6
Analytical	317	208	109	34.4
Inorganic	257	165	92	35.8
Medicinal/pharmaceutical	96	64	32	33.3
Nuclear	5	2	3	60.0
Organic	483	349	134	27.7
Physical	338	245	93	27.5
Polymer	116	88	28	24.1
Theoretical	40	30	10	25.0
Chemistry, general	458	323	135	29.5
Chemistry, other	51	26	25	49.0

See explanatory information and SOURCES at end of table.

Appendix table 4-32. Total doctorate recipients, by detailed field and sex: 1995

Field of study	Total	Men	Women	Percent women
Physics	1,479	1,297	182	12.3
Acoustics	18	15	3	16.7
Chemical and atomic/molecular	110	95	15	13.6
Elementary particle	183	176	7	3.8
Fluids	18	18	0	0.0
Nuclear	91	79	12	13.2
Optics	98	85	13	13.3
Plasma and high temperature	46	41	5	10.9
Polymer	23	20	3	13.0
Solid state and low temperature	371	314	57	15.4
Physics, general	355	314	41	11.5
Physics, other	166	140	26	15.7
Other physical sciences	27	22	5	18.5
Earth, atmospheric, and ocean sciences, total	778	608	170	21.9
Atmospheric sciences	130	107	23	17.7
Atmospheric dynamics	16	13	3	18.8
Atmospheric physics/chemistry	27	19	8	29.6
Meteorology	25	22	3	12.0
Atmospheric science/meteorology, general	44	37	7	15.9
Atmospheric science/meteorology, other	18	16	2	11.1
Geosciences	454	363	91	20.0
Geology	186	148	38	20.4
Geochemistry	42	32	10	23.8
Geomorphology/glacial geology	11	7	4	36.4
Geophysics/seismology	93	74	19	20.4
Hydrology/water resources	24	20	4	16.7
Mineralogy/petrology	19	15	4	21.1
Paleontology	20	17	3	15.0
Stratigraphy/sedimentation	16	15	1	6.3
Geological and related sciences, general	21	17	4	19.0
Geological and related sciences, other	22	18	4	18.2
Oceanography	114	86	28	24.6
Marine sciences	31	23	8	25.8
Oceanography	83	63	20	24.1
Other environmental sciences	80	52	28	35.0
Mathematical/computer sciences, total	2,188	1,737	451	20.6
Mathematics, total	1,190	925	265	22.3
Algebra	82	58	24	29.3
Analysis/functional analysis	99	81	18	18.2
Applied mathematics	211	164	47	22.3
Computing theory	14	12	2	14.3
Geometry	45	37	8	17.8
Logic	35	28	7	20.0
Mathematical statistics	205	151	54	26.3
Number theory	35	26	9	25.7
Operations research	36	31	5	13.9
Topology	51	43	8	15.7
Mathematics, general	305	241	64	21.0
Mathematics, other	72	53	19	26.4

See explanatory information and SOURCES at end of table.

Appendix table 4-32. Total doctorate recipients, by detailed field and sex: 1995

Page 3 of 5

Field of study	Total	Men	Women	Percent women
Computer sciences, total	998	812	186	18.6
Computer science	914	754	160	17.5
Information science/systems	84	58	26	31.0
Biological/agricultural sciences, total	6,406	3,964	2,442	38.1
Biological sciences, total	5,370	3,156	2,214	41.2
Bacteriology	13	7	6	46.2
Biochemistry	825	483	342	41.5
Biomedical sciences	93	52	41	44.1
Biophysics	154	109	45	29.2
Biotechnology research	4	2	2	50.0
Plant genetics	35	23	12	34.3
Plant pathology	32	22	10	31.3
Plant physiology	55	34	21	38.2
Botany, other	102	68	34	33.3
Anatomy	65	39	26	40.0
Biometrics/biostatistics	67	44	23	34.3
Cell biology	236	119	117	49.6
Developmental biology/embryology	64	34	30	46.9
Ecology	203	139	64	31.5
Endocrinology	20	14	6	30.0
Entomology	121	94	27	22.3
Biological immunology	191	109	82	42.9
Microbiology	426	238	188	44.1
Molecular biology	618	352	266	43.0
Neuroscience	305	186	119	39.0
Nutritional sciences	136	44	92	67.6
Parasitology	14	7	7	50.0
Toxicology	123	75	48	39.0
Human/animal genetics	202	110	92	45.5
Human/animal pathology	109	71	38	34.9
Human/animal pharmacology	274	147	127	46.4
Human/animal physiology	262	159	103	39.3
Zoology, other	145	95	50	34.5
Biological sciences, general	350	201	149	42.6
Biological sciences, other	126	79	47	37.3
Agricultural sciences, total	1,036	808	228	22.0
Agronomy and crop science	114	101	13	11.4
Animal breeding/genetics	19	18	1	5.3
Animal nutrition	50	41	9	18.0
Dairy science	14	11	3	21.4
Poultry science	11	11	0	0.0
Animal sciences, other	85	66	19	22.4
Fisheries science & management	49	40	9	18.4
Wildlife/range management	50	42	8	16.0
Food engineering	7	7	0	0.0
Food sciences, other	135	81	54	40.0
Forest biology	24	19	5	20.8
Forest engineering	4	4	0	0.0

See explanatory information and SOURCES at end of table.

Appendix table 4-32. Total doctorate recipients, by detailed field and sex: 1995

Field of study	Total	Men	Women	Percent women
Forest management	20	14	6	30.0
Wood science and pulp/paper technology	25	19	6	24.0
Conservation/renewable natural resources	24	19	5	20.8
Forestry and related sciences, other	72	59	13	18.1
Horticulture science	67	45	22	32.8
Plant breeding/genetics	72	57	15	20.8
Plant pathology	52	43	9	17.3
Plant sciences, other	30	27	3	10.0
Soil chemistry/microbiology	27	22	5	18.5
Soil sciences, other	72	54	18	25.0
Agricultural sciences, general	6	3	3	50.0
Agricultural sciences, other	7	5	2	28.6
Psychology, total	3,419	1,247	2,172	63.5
Clinical	1,292	425	867	67.1
Cognitive psychology and psycholinguistics	104	52	52	50.0
Comparative	4	3	1	25.0
Counseling	470	173	297	63.2
Developmental and child	153	31	122	79.7
Educational	74	21	53	71.6
Experimental	151	68	83	55.0
Family and marriage counseling	51	16	35	68.6
Industrial/organizational	145	61	84	57.9
Physiological/psychobiology	93	58	35	37.6
Quantitative	13	4	9	69.2
Personality	16	7	9	56.3
Psychometrics	10	6	4	40.0
School	91	29	62	68.1
Social	155	71	84	54.2
Psychology, general	307	121	186	60.6
Psychology, other	290	101	189	65.2
Social sciences, total[1]	3,877	2,411	1,466	37.8
Economics	1,153	875	278	24.1
Agricultural economics	173	131	42	24.3
Econometrics	26	22	4	15.4
Economics	954	722	232	24.3
Political science	893	627	266	29.8
International relations and affairs	72	51	21	29.2
Political science/government	600	433	167	27.8
Public administration	129	86	43	33.3
Public policy analysis	92	57	35	38.0

See explanatory information and SOURCES at end of table.

Appendix table 4-32. Total doctorate recipients, by detailed field and sex: 1995

Field of study	Total	Men	Women	Percent women
Sociology	554	260	294	53.1
Demography/population studies	15	9	6	40.0
Sociology	539	251	288	53.4
Other social sciences	1,277	649	628	49.2
American studies	94	41	53	56.4
Anthropology	375	156	219	58.4
Archaeology	35	17	18	51.4
Area studies	27	15	12	44.4
Criminology	44	21	23	52.3
Geography	150	107	43	28.7
History/philosophy of science and technology	41	23	18	43.9
Linguistics	201	99	102	50.7
Statistics	48	37	11	22.9
Urban affairs and studies	103	66	37	35.9
Social sciences, general	35	12	23	65.7
Social sciences, other	124	55	69	55.6
NonS&E, total [2]	15,095	7,035	8,060	53.4
Health	1,331	487	844	63.4
Humanities [1]	4,690	2,436	2,254	48.1
Education	6,546	2,514	4,032	61.6
Professional/other	2,528	1,598	930	36.8
Grand total, all fields	41,610	25,277	16,333	39.3

[1] Categories differ from those published by other Federal sponsors and the National Research Council because linguistics, history of science, American studies, and archaeology are included in social sciences rather than in humanities.

[2] Non-science and -engineering doctorates include those whose field of specialization is unknown.

SOURCE: National Science Foundation/SRS, Survey of Earned Doctorates 1995.

Appendix table 4-33. The top 50 institutions granting science and engineering doctorates to women, and women as a percentage of recipients, by institution: 1995

Academic institution	Science and engineering			Science			Engineering		
	Total	Women	Percentage women	Total	Women	Percentage women	Total	Women	Percentage women
University of California-Berkeley	608	170	28.0	430	144	33.5	178	26	14.6
University of California-Los Angeles	435	147	33.8	350	137	39.1	85	10	11.8
University of Wisconsin-Madison	531	143	26.9	420	127	30.2	111	16	14.4
Cornell University, all campuses	430	142	33.0	342	123	36.0	88	19	21.6
University of Michigan at Ann Arbor	472	134	28.4	294	113	38.4	178	21	11.8
University of Illinois at Urbana-Champaign	519	123	23.7	362	106	29.3	157	17	10.8
University of Minnesota-Twin Cities	439	121	27.6	326	112	34.4	113	9	8.0
Ohio State University, main campus	425	114	26.8	323	104	32.2	102	10	9.8
Stanford University	466	110	23.6	259	71	27.4	207	39	18.8
Pennsylvania State University, main campus	401	109	27.2	241	90	37.3	160	19	11.9
Subtotal, first 10 institutions	4,726	1,313	27.8	3,347	1,127	33.7	1,379	186	13.5
University of Texas at Austin	458	109	23.8	284	97	34.2	174	12	6.9
University of Pennsylvania	318	108	34.0	265	96	36.2	53	12	22.6
Harvard University	297	103	34.7	287	101	35.2	10	2	20.0
University of Maryland at College Park	320	101	31.6	216	86	39.8	104	15	14.4
Northwestern University	252	99	39.3	177	86	48.6	75	13	17.3
University of California-Davis	302	98	32.5	255	95	37.3	47	3	6.4
Michigan State University	283	97	34.3	247	91	36.8	36	6	16.7
University of Southern California	308	94	30.5	208	84	40.4	100	10	10.0
Purdue University, main campus	399	91	22.8	259	81	31.3	140	10	7.1
University of Washington	332	91	27.4	252	79	31.3	80	12	15.0
Subtotal, first 20 institutions	7,995	2,304	28.8	5,797	2,023	34.9	2,198	281	12.8
Massachusetts Institute of Technology	486	90	18.5	250	55	22.0	236	35	14.8
Columbia University in the City of New York	281	87	31.0	248	79	31.9	33	8	24.2
University of North Carolina at Chapel Hill	227	87	38.3	219	84	38.4	8	3	37.5
Rutgers the State University of NJ New Brunswick	260	86	33.1	205	81	39.5	55	5	9.1
Texas A&M University, main campus	432	85	19.7	307	74	24.1	125	11	8.8
University of Colorado at Boulder	267	82	30.7	177	74	41.8	90	8	8.9
University of Florida	289	81	28.0	204	78	38.2	85	3	3.5
Yale University	222	76	34.2	203	73	36.0	19	3	15.8
University of California-San Diego	227	72	31.7	192	68	35.4	35	4	11.4
University of Chicago	241	69	28.6	240	68	28.3	1	1	100.0
Subtotal, first 30 institutions	10,927	3,119	28.5	8,042	2,757	34.3	2,885	362	12.5
CUNY Graduate School and University Center	193	68	35.2	178	65	36.5	15	3	20.0
Indiana University at Bloomington	176	65	36.9	176	65	36.9	0	0	-
State University of NY at Stony Brook, all campuses	188	65	34.6	166	62	37.3	22	3	13.6
University of Connecticut	164	65	39.6	139	63	45.3	25	2	8.0
University of Georgia	160	64	40.0	160	64	40.0	0	0	-
Johns Hopkins University	185	63	34.1	149	55	36.9	36	8	22.2
University of Arizona	273	63	23.1	217	61	28.1	56	2	3.6
New York University	159	61	38.4	159	61	38.4	0	0	-
North Carolina State University at Raleigh	250	60	24.0	158	49	31.0	92	11	12.0
University of Cincinnati, all campuses	159	60	37.7	106	55	51.9	53	5	9.4
Subtotal, first 40 institutions	12,834	3,753	29.2	9,650	3,357	34.8	3,184	396	12.4
Princeton University	221	57	25.8	173	49	28.3	48	8	16.7
Temple University	115	57	49.6	111	57	51.4	4	0	-
University of Virginia, main campus	185	57	30.8	138	51	37.0	47	6	12.8
California School Prof Psych at Los Angeles	71	56	78.9	71	56	78.9	0	0	-
State University of NY at Buffalo	192	56	29.2	134	51	38.1	58	5	8.6
California School Prof Psych at San Diego	80	55	68.8	80	55	68.8	0	0	-
University of Pittsburgh, main campus	157	55	35.0	120	51	42.5	37	4	10.8
Duke University	177	54	30.5	141	48	34.0	36	6	16.7
Iowa State University	260	54	20.8	180	44	24.4	80	10	12.5
University of Iowa	173	54	31.2	139	52	37.4	34	2	5.9
Subtotal, first 50 institutions	14,465	4,308	29.8	10,937	3,871	35.4	3,528	437	12.4

KEY: - = cannot be calculated.

SOURCE: National Science Foundation/SRS. Survey of Earned Doctorates 1995

Appendix table 4-34. Doctorate recipients in science and engineering, by field, primary mechanism of support, and sex: 1995

Page 1 of 1

Field and primary mechanism of support	Total		Women		Men	
	Number	Percent	Number	Percent	Number	Percent
Total, science and engineering						
All mechanisms	26,515	100.0	8,273	100.0	18,242	100.0
Fellowship/Traineeship	2,350	8.9	943	11.4	1,407	7.7
Research assistantship	7,891	29.8	2,030	24.5	5,861	32.1
Teaching assistantship	3,652	13.8	1,096	13.2	2,556	14.0
Other sources, unknown	12,622	47.6	4,204	50.8	8,418	46.1
Physical sciences						
All mechanisms	3,840	100.0	878	100.0	2,962	100.0
Fellowship/Traineeship	203	5.3	61	6.9	142	4.8
Research assistantship	1,679	43.7	372	42.4	1,307	44.1
Teaching assistantship	661	17.2	154	17.5	507	17.1
Other sources, unknown	1,297	33.8	291	33.1	1,006	34.0
Earth, atmospheric and ocean sciences						
All mechanisms	778	100.0	170	100.0	608	100.0
Fellowship/Traineeship	39	5.0	11	6.5	28	4.6
Research assistantship	314	40.4	70	41.2	244	40.1
Teaching assistantship	77	9.9	16	9.4	61	10.0
Other sources, unknown	348	44.7	73	42.9	275	45.2
Mathematical and computer sciences						
All mechanisms	2,188	100.0	451	100.0	1,737	100.0
Fellowship/Traineeship	120	5.5	32	7.1	88	5.1
Research assistantship	449	20.5	66	14.6	383	22.0
Teaching assistantship	718	32.8	154	34.1	564	32.5
Other sources, unknown	901	41.2	199	44.1	702	40.4
Agricultural sciences						
All mechanisms	1,036	100.0	228	100.0	808	100.0
Fellowship/Traineeship	51	4.9	13	5.7	38	4.7
Research assistantship	407	39.3	83	36.4	324	40.1
Teaching assistantship	33	3.2	12	5.3	21	2.6
Other sources, unknown	545	52.6	120	52.6	425	52.6
Biological sciences						
All mechanisms	5,370	100.0	2,214	100.0	3,156	100.0
Fellowship/Traineeship	1,001	18.6	424	19.2	577	18.3
Research assistantship	1,673	31.2	714	32.2	959	30.4
Teaching assistantship	566	10.5	224	10.1	342	10.8
Other sources, unknown	2,130	39.7	852	38.5	1,278	40.5
Psychology						
All mechanisms	3,419	100.0	2,172	100.0	1,247	100.0
Fellowship/Traineeship	217	6.3	140	6.4	77	6.2
Research assistantship	395	11.6	240	11.0	155	12.4
Teaching assistantship	368	10.8	219	10.1	149	11.9
Other sources, unknown	2,439	71.3	1,573	72.4	866	69.4
Social sciences						
All mechanisms	3,877	100.0	1,466	100.0	2,411	100.0
Fellowship/Traineeship	437	11.3	183	12.5	254	10.5
Research assistantship	413	10.7	159	10.8	254	10.5
Teaching assistantship	781	20.1	275	18.8	506	21.0
Other sources, unknown	2,246	57.9	849	57.9	1,397	57.9
Engineering						
All mechanisms	6,007	100.0	694	100.0	5,313	100.0
Fellowship/Traineeship	282	4.7	79	11.4	203	3.8
Research assistantship	2,561	42.6	326	47.0	2,235	42.1
Teaching assistantship	448	7.5	42	6.1	406	7.6
Other sources, unknown	2,716	45.2	247	35.6	2,469	46.5

NOTE: Because of rounding, details may not add to totals.

SOURCE: National Science Foundation/SRS. Survey of Earned Doctorates 1995.

Appendix table 4-35. Top 50 institutions that were baccalaureate origins of 1991-1995 female science and engineering doctorate recipients, ranked according to total science and engineering doctorates to women, by field of doctorate

Rank	Academic Institution	Total S&E	Sciences								Total engineering
			Total sciences	Physical sciences	Earth, atmospheric, and ocean sciences	Mathematics	Computer sciences	Agricultural/ biological sciences	Psychology	Social Sciences	
	Total of all academic institutions	37,855	35,031	3,935	880	1,169	698	11,120	10,286	6,943	2,824
1	University of California-Berkeley	509	458	39	15	11	6	151	119	117	51
2	Cornell University, all campuses	403	368	37	10	2	6	160	104	49	35
3	University of Michigan at Ann Arbor	400	355	20	5	6	2	93	147	82	45
4	University of Illinois at Urbana-Champaign	349	307	23	11	5	5	130	82	51	42
5	University of California-Los Angeles	334	321	17	11	2	4	67	168	52	13
6	University of Wisconsin-Madison	329	311	16	9	5	4	108	105	64	18
7	Pennsylvania State University, main campus	266	232	15	1	4	2	116	54	40	34
8	University of California-Davis	241	229	11	10	0	2	134	41	31	12
9	Rutgers the State University of NJ New Brunswick	234	219	23	6	5	3	90	65	27	15
10	Massachusetts Institute of Technology	231	151	43	4	5	14	64	7	14	80
11	University of Maryland at College Park	230	216	14	3	3	4	75	75	42	14
12	Ohio State University, main campus	226	212	10	9	2	3	67	68	53	14
13	Michigan State University	218	205	10	5	0	3	78	69	40	13
14	Brown University	210	199	5	12	3	3	47	88	41	11
15	University of Minnesota-Twin Cities	210	198	15	4	0	3	73	55	48	12
16	University of California-San Diego	207	190	13	2	6	0	77	57	35	17
17	University of Pennsylvania	206	194	12	1	2	3	52	74	50	12
18	Harvard University	203	195	21	8	9	8	57	34	58	8
19	University of Texas at Austin	201	187	8	6	3	1	43	83	43	14
20	Stanford University	194	172	9	10	3	2	50	52	46	22
21	Yale University	184	176	13	6	5	3	52	41	56	8
22	University of Colorado at Boulder	180	164	14	5	6	2	47	53	37	16
23	Duke University	173	159	12	6	1	4	52	61	23	14
24	Indiana University at Bloomington	169	167	12	4	1	1	45	60	44	2
25	Princeton University	166	142	17	5	5	4	62	18	31	24
26	Purdue University, main campus	164	123	14	3	1	3	57	31	14	41
27	University of California-Santa Barbara	163	157	9	8	2	6	51	50	31	6
28	University of Washington	160	146	8	1	2	1	50	44	40	14
29	Texas A&M University, main campus	159	144	8	11	1	1	79	35	9	15
30	University of California-Irvine	159	155	16	1	3	3	45	67	20	4
31	University of Florida	155	147	12	2	2	3	43	54	31	8
32	Smith College	153	153	13	9	7	2	47	39	36	0
33	University of Virginia, main campus	151	133	11	3	1	1	45	53	19	18
34	University of Massachusetts at Amherst	145	135	3	6	3	1	46	41	35	10
35	State University of New York at Buffalo	138	128	12	4	4	1	30	51	26	10
36	University of North Carolina at Chapel Hill	136	130	12	6	3	2	41	48	18	6
37	Virginia Polytechnic Institute and State University	136	105	13	3	2	1	53	25	8	31
38	Wellesley College	136	133	10	6	4	2	33	39	39	3
39	University of Delaware	135	123	15	6	1	1	53	26	21	12
40	University of California-Santa Cruz	133	131	5	7	1	2	39	39	38	2
41	Barnard College	132	131	6	2	1	2	19	57	44	1
42	Boston University	131	125	7	1	2	1	25	62	27	6
43	Iowa State University	131	120	12	3	2	3	58	23	19	11
44	Oberlin College	131	128	16	5	5	2	26	35	39	3
45	State University of New York at Albany	130	130	6	1	1	3	36	56	27	0
46	Mount Holyoke College	124	121	13	3	5	1	50	27	22	3
47	University of Chicago	124	121	10	6	4	1	34	33	33	3
48	University of Rochester	121	107	8	6	0	0	36	46	11	14
49	Bryn Mawr College	120	115	15	3	8	1	25	19	44	5
50	University of Puerto Rico, Rio Piedras campus	120	116	22	1	2	1	22	42	26	4

SOURCE: National Science Foundation/SRS, Survey of Earned Doctorates 1995

Table 4-36. Postgraduation plans of science and engineering doctorate recipients who are U.S. citizens and permanent residents, by sex and detailed field: 1995

Page 1 of 2

Field of study	Total	Total with definite plans	In the United States: Total in U.S.	Post-doctoral study	Academic employment	Industry employment	Other	Abroad	Location unknown
Science and engineering, both sexes	18,961	11,841	11,261	4,850	2,695	2,180	1,536	554	26
Engineering, total	3,336	1,904	1,831	374	312	889	256	68	5
Aeronautical/astronautical	153	83	82	17	8	29	28	1	0
Chemical	381	242	233	50	25	137	21	9	0
Civil	309	173	166	26	57	55	28	6	1
Electrical	971	568	551	75	87	326	63	17	0
Industrial	149	79	71	2	36	26	7	7	1
Materials/metallurgical	351	201	191	71	11	84	25	9	1
Mechanical	558	293	284	51	46	155	32	7	2
Other engineering	464	265	253	82	42	77	52	12	0
Sciences, total	15,625	9,937	9,430	4,476	2,383	1,291	1,280	486	21
Physical sciences, total	2,840	1,767	1,645	1,021	166	356	102	113	9
Astronomy	141	105	93	69	15	4	5	12	0
Chemistry	1,623	1,038	994	608	94	244	48	42	2
Physics	1,059	616	551	338	57	107	49	58	7
Other physical sciences	17	8	7	6	0	1	0	1	0
Earth, atmospheric, and ocean sciences	593	343	316	138	63	47	68	27	0
Mathematics	771	446	425	98	221	78	28	20	1
Computer sciences	617	393	373	45	143	147	38	19	1
Biological sciences	4,321	3,023	2,884	2,313	280	143	148	131	8
Agricultural sciences	598	347	318	104	80	85	49	29	0
Psychology	3,169	1,932	1,906	582	485	294	545	25	1
Social sciences	2,716	1,686	1,563	175	945	141	302	122	1
Science and engineering, women	6,892	4,335	4,182	1,859	1,155	539	629	146	7
Engineering, total	518	296	287	64	75	111	37	8	1
Aeronautical/astronautical	12	5	5	1	0	0	4	0	0
Chemical	88	62	60	12	8	36	4	2	0
Civil	52	31	30	5	19	4	2	1	0
Electrical	120	65	63	8	17	31	7	2	0
Industrial	34	16	15	0	11	3	1	1	0
Materials/metallurgical	78	43	42	10	2	24	6	1	0
Mechanical	48	21	20	7	5	5	3	0	1
Other engineering	86	53	52	21	13	8	10	1	0

See explanatory information and SOURCES at end of table.

Table 4-36. Postgraduation plans of science and engineering doctorate recipients who are U.S. citizens and permanent residents, by sex and detailed field: 1995

Page 2 of 2

Field of study	Total	Total with definite plans	In the United States: Total in U.S.	Post-doctoral study	Academic employment	Industry employment	Other	Abroad	Location unknown
Sciences, total	6,374	4,039	3,895	1,795	1,080	428	592	138	6
Physical sciences, total	708	438	415	241	71	77	26	21	2
Astronomy	25	20	18	15	2	1	0	2	0
Chemistry	537	334	317	184	49	65	19	15	2
Physics	143	82	78	41	20	10	7	4	0
Other physical sciences	3	2	2	1	0	1	0	0	0
Earth, atmospheric, and ocean sciences	144	83	79	35	15	10	19	4	0
Mathematics	183	107	104	15	67	15	7	3	0
Computer sciences	143	96	91	11	48	22	10	5	0
Biological sciences	1,854	1,278	1,227	1,001	114	50	62	47	4
Agricultural sciences	135	68	65	24	19	9	13	3	0
Psychology	2,044	1,221	1,208	366	314	191	337	13	0
Social sciences	1,163	748	706	102	432	54	118	42	0
Science and engineering, men	12,069	7,506	7,079	2,991	1,540	1,641	907	408	19
Engineering, total	2,818	1,608	1,544	310	237	778	219	60	4
Aeronautical/astronautical	141	78	77	16	8	29	24	1	0
Chemical	293	180	173	38	17	101	17	7	0
Civil	257	142	136	21	38	51	26	5	1
Electrical	851	503	488	67	70	295	56	15	0
Industrial	115	63	56	2	25	23	6	6	1
Materials/metallurgical	273	158	149	61	9	60	19	8	1
Mechanical	510	272	264	44	41	150	29	7	1
Other engineering	378	212	201	61	29	69	42	11	0
Sciences, total	9,251	5,898	5,535	2,681	1,303	863	688	348	15
Physical sciences, total	2,132	1,329	1,230	780	95	279	76	92	7
Astronomy	116	85	75	54	13	3	5	10	0
Chemistry	1,086	704	677	424	45	179	29	27	0
Physics	916	534	473	297	37	97	42	54	7
Other physical sciences	14	6	5	5	0	0	0	1	0
Earth, atmospheric, and ocean sciences	449	260	237	103	48	37	49	23	0
Mathematics	588	339	321	83	154	63	21	17	1
Computer sciences	474	297	282	34	95	125	28	14	1
Biological sciences	2,467	1,745	1,657	1,312	166	93	86	84	4
Agricultural sciences	463	279	253	80	61	76	36	26	0
Psychology	1,125	711	698	216	171	103	208	12	1
Social sciences	1,553	938	857	73	513	87	184	80	1

SOURCE: National Science Foundation/SRS, Survey of Earned Doctorates 1995.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 4-37. Total master's degrees awarded, by field, citizenship status, and race/ethnicity of U.S. citizens and permanent residents: 1987-1995, selected years

Page 1 of 3

Field and race/ethnicity	1987	1989	1990	1991	1992	1993	1994	1995
Total, all recipients								
Total science and engineering	66,774	70,333	72,228	72,828	76,184	81,415	86,080	88,431
Sciences	44,717	46,598	48,243	48,821	51,174	53,757	57,373	59,814
Physical science	5,638	5,703	5,411	5,282	5,352	5,365	5,688	5,735
Mathematical science	3,327	3,430	3,684	3,632	4,019	4,084	4,108	4,190
Computer science	8,481	9,399	9,643	9,324	9,530	10,167	10,421	10,332
Biological science	2,824	4,953	4,893	4,806	4,816	4,798	5,217	5,423
Agricultural science	4,999	2,604	2,662	2,625	3,058	3,299	3,435	3,612
Psychology	8,165	8,652	9,308	9,802	10,280	11,020	12,274	14,021
Social sciences	11,283	11,857	12,642	13,350	14,119	15,024	16,230	16,501
Engineering	22,057	23,735	23,985	24,007	25,010	27,658	28,707	28,617
Non-science and -engineering	223,758	240,717	252,719	265,670	278,023	289,558	302,928	310,997
Grand total	290,532	311,050	324,947	338,498	354,207	370,973	389,008	399,428
Total, U.S. citizens and permanent residents:								
Total science and engineering	53,729	55,190	55,890	55,779	58,177	61,265	65,201	67,110
Sciences	37,453	38,202	39,144	39,292	41,066	42,726	45,851	48,189
Physical science	4,582	4,465	4,047	3,778	3,814	3,763	3,918	3,980
Mathematical science	2,491	2,454	2,649	2,573	2,907	2,946	3,013	3,034
Computer science	6,414	6,957	7,080	6,505	6,361	6,388	6,509	6,452
Biological science	4,490	4,317	4,164	4,057	4,021	3,949	4,284	4,543
Agricultural science	2,257	1,974	2,023	2,022	2,356	2,605	2,727	2,948
Psychology	7,945	8,393	8,923	9,485	9,978	10,688	11,913	13,537
Social sciences	9,274	9,642	10,258	10,872	11,629	12,387	13,487	13,695
Engineering	16,276	16,988	16,746	16,487	17,111	18,539	19,350	18,921
Non-science and -engineering	208,539	223,737	234,455	245,108	256,378	265,599	277,301	283,562
Grand total	262,268	278,927	290,345	300,887	314,555	326,864	342,502	350,672
White, non-Hispanic								
Total science and engineering	43,360	43,945	44,450	44,513	45,649	47,975	50,711	51,417
Sciences	30,523	31,113	31,591	31,878	32,897	34,055	36,242	37,596
Physical science	3,834	3,766	3,401	3,129	3,067	3,078	3,145	3,179
Mathematical science	2,012	2,032	2,169	2,068	2,336	2,354	2,379	2,342
Computer science	4,717	4,786	4,851	4,637	4,407	4,464	4,286	4,205
Biological science	3,745	3,679	3,501	3,353	3,251	3,144	3,453	3,589
Agricultural science	2,044	1,817	1,820	1,818	2,075	2,282	2,261	2,474
Psychology	6,698	7,075	7,489	7,973	8,238	8,810	9,960	11,107
Social sciences	7,473	7,958	8,360	8,900	9,523	9,923	10,758	10,700
Engineering	12,837	12,832	12,859	12,635	12,752	13,920	14,469	13,821
Non-science and -engineering	173,447	186,377	192,424	203,011	211,413	217,693	223,202	226,020
Grand total	216,807	230,322	236,874	247,524	257,062	265,668	273,913	277,437
Asian								
Total science and engineering	3,455	4,100	4,055	4,310	4,763	4,846	5,422	5,683
Sciences	1,805	2,108	2,192	2,302	2,540	2,586	2,979	3,111
Physical science	227	278	234	251	295	249	284	288
Mathematical science	183	178	184	189	201	197	233	239
Computer science	779	894	941	1,014	1,105	1,106	1,228	1,239
Biological science	190	223	225	231	264	305	332	417
Agricultural science	47	44	45	50	51	61	82	97
Psychology	113	131	159	170	183	191	270	298
Social sciences	266	360	404	397	441	477	550	533
Engineering	1,650	1,992	1,863	2,008	2,223	2,260	2,443	2,572
Non-science and -engineering	4,674	6,074	5,939	6,760	7,530	8,323	9,137	10,223
Grand total	8,129	10,174	9,994	11,070	12,293	13,169	14,559	15,906

See explanatory information and SOURCES at end of table.

Appendix table 4-37. Total master's degrees awarded, by field, citizenship status, and race/ethnicity of U.S. citizens and permanent residents: 1987-1995, selected years

Field and race/ethnicity	1987	1989	1990	1991	1992	1993	1994	1995
Black, non-Hispanic								
Total science and engineering	1,784	1,652	1,847	2,090	2,356	2,554	2,849	3,339
Sciences	1,381	1,297	1,460	1,692	1,890	1,990	2,260	2,674
Physical science	79	78	87	73	98	105	127	147
Mathematical science	73	59	70	100	77	98	109	151
Computer science	207	198	232	283	316	308	365	347
Biological science	167	124	110	137	149	135	142	162
Agricultural science	55	36	28	51	59	70	78	74
Psychology	376	395	471	454	531	544	636	863
Social sciences	424	407	462	594	660	730	803	930
Engineering	403	355	387	398	466	564	589	665
Non-science and -engineering	11,389	11,803	12,626	13,767	15,064	16,343	18,087	19,615
Grand total	13,173	13,455	14,473	15,857	17,420	18,897	20,936	22,954
Hispanic								
Total science and engineering	1,584	1,585	1,587	1,736	1,806	2,092	2,514	2,585
Sciences	1,072	1,117	1,141	1,268	1,318	1,511	1,795	1,874
Physical science	122	92	98	96	93	114	114	129
Mathematical science	60	34	51	85	66	78	75	75
Computer science	123	144	118	128	149	162	169	198
Biological science	126	126	120	136	146	151	138	167
Agricultural science	62	48	44	49	49	69	184	96
Psychology	271	360	369	391	419	463	558	656
Social sciences	308	313	341	383	396	474	557	553
Engineering	512	468	446	468	488	581	719	711
Non-science and -engineering	6,197	6,548	6,908	7,948	8,450	9,279	10,663	11,320
Grand total	7,781	8,133	8,495	9,684	10,256	11,371	13,177	13,905
American Indian								
Total science and engineering	147	209	181	200	198	253	273	299
Sciences	109	176	146	160	156	203	213	256
Physical science	9	18	9	13	18	12	16	19
Mathematical science	3	6	6	9	4	8	6	11
Computer science	22	39	7	14	15	14	18	16
Biological science	11	17	14	13	12	26	17	20
Agricultural science	3	6	8	8	7	8	11	13
Psychology	35	33	37	49	38	57	62	85
Social sciences	26	57	65	54	62	78	83	92
Engineering	38	33	35	40	42	50	60	43
Non-science and -engineering	902	873	869	925	1,030	1,091	1,345	1,243
Grand total	1,049	1,082	1,050	1,125	1,228	1,344	1,618	1,542
Unknown Race/Ethnicity								
Total science and engineering	3,399	3,699	3,770	2,930	3,405	3,545	3,432	3,787
Sciences	2,563	2,391	2,614	1,992	2,265	2,381	2,362	2,678
Physical science	311	233	218	216	243	205	232	218
Mathematical science	160	145	169	122	223	211	211	216
Computer science	566	896	931	429	369	334	443	447
Biological science	251	148	194	187	199	188	202	188
Agricultural science	46	23	78	46	115	115	111	194
Psychology	452	399	398	448	569	623	427	528
Social sciences	777	547	626	544	547	705	736	887
Engineering	836	1,308	1,156	938	1,140	1,164	1,070	1,109
Non-science and -engineering	11,930	12,062	15,689	12,697	12,891	12,870	14,867	15,141
Grand total	15,329	15,761	19,459	15,627	16,296	16,415	18,299	18,928

See explanatory information and SOURCES at end of table.

Appendix table 4-37. Total master's degrees awarded, by field, citizenship status, and race/ethnicity of U.S. citizens and permanent residents: 1987-1995, selected years

Page 3 of 3

Field and race/ethnicity	1987	1989	1990	1991	1992	1993	1994	1995
Nonresident aliens								
Total science and engineering	13,045	15,143	16,338	17,049	18,007	20,150	20,879	21,321
Sciences	7,264	8,396	9,099	9,529	10,108	11,031	11,522	11,625
Physical science	1,056	1,238	1,364	1,504	1,538	1,602	1,770	1,755
Mathematical science	836	976	1,035	1,059	1,112	1,138	1,095	1,156
Computer science	2,067	2,442	2,563	2,819	3,169	3,779	3,912	3,880
Biological science	567	636	729	749	795	849	933	880
Agricultural science	509	630	639	603	702	694	708	664
Psychology	220	259	385	317	302	332	361	484
Social sciences	2,009	2,215	2,384	2,478	2,490	2,637	2,743	2,806
Engineering	5,781	6,747	7,239	7,520	7,899	9,119	9,357	9,696
Non-science and -engineering	15,219	16,980	18,264	20,562	21,645	23,959	25,627	27,435
Grand total	28,264	32,123	34,602	37,611	39,652	44,109	46,506	48,756

NOTES: Data on race/ethnicity were collected biennially from 1977 through 1989 and annually thereafter. Data on race/ethnicity of degree recipients are collected on broad fields of study only; therefore, these data could not be adjusted to the exact field taxonomies used by NSF. Racial/ethnic categories as designated on the survey form. Race/ethnicity categories include only U.S. citizens and permanent residents. Nonresident aliens include foreign citizens on temporary visas only. No racial/ethnic data are collected for this group.

SOURCES: Tabulations by National Science Foundation/SRS; data from U.S. Department of Education/NCES IPEDS Completions Surveys, 1987–1995.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 4-38. Master's degrees awarded to U.S. citizens and permanent residents, by sex of recipient, field, and race/ethnicity: 1995

Page 1 of 2

	Total	White, non-Hispanic	Asian	Black, non-Hispanic	Hispanic	American Indian	Unknown race/ ethnicity
Both sexes:							
Total science and engineering	67,110	51,417	5,683	3,339	2,585	299	3,787
Sciences	48,189	37,596	3,111	2,674	1,874	256	2,678
Physical science	3,980	3,179	288	147	129	19	218
Mathematical science	3,034	2,342	239	151	75	11	216
Computer science	6,452	4,205	1,239	347	198	16	447
Biological science	4,543	3,589	417	162	167	20	188
Agricultural science	2,948	2,474	97	74	96	13	194
Psychology	13,537	11,107	298	863	656	85	528
Social sciences	13,695	10,700	533	930	553	92	887
Engineering	18,921	13,821	2,572	665	711	43	1,109
Non-science and -engineering	283,562	226,020	10,223	19,615	11,320	1,243	15,141
Grand total	350,672	277,437	15,906	22,954	13,905	1,542	18,928
Women:							
Total science and engineering	27,326	20,953	1,950	1,805	1,127	148	1,343
Sciences	24,029	18,713	1,401	1,604	994	145	1,172
Physical science	1,202	923	101	61	41	8	68
Mathematical science	1,269	988	105	87	22	6	61
Computer science	1,727	974	454	148	47	5	99
Biological science	2,379	1,849	208	112	92	9	109
Agricultural science	1,246	1,024	53	39	40	3	87
Psychology	9,775	8,005	219	645	482	55	369
Social sciences	6,431	4,950	261	512	270	59	379
Engineering	3,297	2,240	549	201	133	3	171
Non-science and -engineering	175,307	139,829	5,571	13,513	7,053	771	8,570
Grand total	202,633	160,782	7,521	15,318	8,180	919	9,913
Men:							
Total science and engineering	39,784	30,464	3,733	1,534	1,458	151	2,444
Sciences	24,160	18,883	1,710	1,070	880	111	1,506
Physical science	2,778	2,256	187	86	88	11	150
Mathematical science	1,765	1,354	134	64	53	5	155
Computer science	4,725	3,231	785	199	151	11	348
Biological science	2,164	1,740	209	50	75	11	79
Agricultural science	1,702	1,450	44	35	56	10	107
Psychology	3,762	3,102	79	218	174	30	159
Social sciences	7,264	5,750	272	418	283	33	508
Engineering	15,624	11,581	2,023	464	578	40	938
Non-science and -engineering	108,255	86,191	4,652	6,102	4,267	472	6,571
Grand total	148,039	116,655	8,385	7,636	5,725	623	9,015
Women as percent of total							
Total science and engineering	40.7	40.8	34.3	54.1	43.6	49.5	35.5
Sciences	49.9	49.8	45.0	60.0	53.0	56.6	43.8
Physical science	30.2	29.0	35.1	41.5	31.8	42.1	31.2
Mathematical science	41.8	42.2	43.9	57.6	29.3	54.5	28.2
Computer science	26.8	23.2	36.6	42.7	23.7	31.3	22.1
Biological science	52.4	51.5	49.9	69.1	55.1	45.0	58.0
Agricultural science	42.3	41.4	54.6	52.7	41.7	23.1	44.8
Psychology	72.2	72.1	73.5	74.7	73.5	64.7	69.9
Social sciences	47.0	46.3	49.0	55.1	48.8	64.1	42.7
Engineering	17.4	16.2	21.3	30.2	18.7	7.0	15.4
Non-science and -engineering	61.8	61.9	54.5	68.9	62.3	62.0	56.6
Grand total	57.8	58.0	47.3	66.7	58.8	59.6	52.4

See explanatory information and SOURCES at end of table.

Appendix table 4-38. Master's degrees awarded to U.S. citizens and permanent residents, by sex of recipient, field, and race/ethnicity: 1995

Page 2 of 2

	Total	White, non-Hispanic	Asian	Black, non-Hispanic	Hispanic	American Indian	Unknown race/ ethnicity
Percent of women							
Total science and engineering	100.0	76.7	7.1	6.6	4.1	0.5	4.9
Sciences	100.0	77.9	5.8	6.7	4.1	0.6	4.9
Physical science	100.0	76.8	8.4	5.1	3.4	0.7	5.7
Mathematical science	100.0	77.9	8.3	6.9	1.7	0.5	4.8
Computer science	100.0	56.4	26.3	8.6	2.7	0.3	5.7
Biological science	100.0	77.7	8.7	4.7	3.9	0.4	4.6
Agricultural science	100.0	82.2	4.3	3.1	3.2	0.2	7.0
Psychology	100.0	81.9	2.2	6.6	4.9	0.6	3.8
Social sciences	100.0	77.0	4.1	8.0	4.2	0.9	5.9
Engineering	100.0	67.9	16.7	6.1	4.0	0.1	5.2
Non-science and -engineering	100.0	79.8	3.2	7.7	4.0	0.4	4.9
Grand total	100.0	79.3	3.7	7.6	4.0	0.5	4.9

NOTES: Data on race/ethnicity were collected biennially from 1977 through 1989 and annually thereafter. Data on race/ethnicity of degree recipients are collected on broad fields of study only; therefore, these data could not be adjusted to the exact field taxonomies used by NSF. Racial/ethnic categories as designated on the survey form. These categories include U.S. citizens and foreign citizens on permanent visas (i.e., resident alients who have been admitted for permanent residency).

SOURCES: Tabulations by National Science Foundation/SRS; data from U.S. Department of Education/NCES biennial data from the HEGIS Earned Degrees Surveys, 1985, and IPEDS Completions Surveys, 1987–1993.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 4-39. Science and engineering doctorates, by field and race/ethnicity: 1985-1995

Field and race/ethnicity	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Science and engineering, total	14,065	14,016	14,055	14,499	14,591	15,363	15,909	15,940	16,570	18,184	18,961
Engineering, total	1,594	1,726	1,913	2,146	2,229	2,346	2,474	2,520	2,697	3,053	3,336
Chemical	292	298	350	408	444	392	399	378	377	380	381
Civil	170	192	203	233	247	241	213	215	227	292	309
Electrical	353	410	393	503	539	599	686	719	795	899	971
Mechanical	251	267	308	327	325	368	359	426	434	538	558
Other engineering	528	559	659	675	674	746	817	782	864	944	1,117
Sciences, total	12,471	12,290	12,142	12,353	12,362	13,017	13,435	13,420	13,873	15,131	15,625
Physical sciences, total	2,187	2,166	2,242	2,258	2,131	2,341	2,299	2,356	2,330	2,789	2,840
Astronomy	84	91	73	104	82	96	86	106	111	112	141
Chemistry	1,432	1,413	1,472	1,451	1,383	1,497	1,460	1,440	1,400	1,616	1,623
Physics	662	643	682	681	654	725	739	790	806	1,044	1,059
Other physical sciences	9	19	15	22	12	23	14	20	13	17	17
Earth, atmospheric, and ocean sciences	465	427	435	520	547	535	618	541	504	613	593
Mathematics	418	402	396	386	428	422	518	507	590	657	771
Computer sciences	213	249	275	326	396	403	451	489	509	543	617
Biological sciences	3,256	3,241	3,141	3,323	3,299	3,379	3,521	3,567	3,751	4,085	4,321
Agricultural sciences	726	626	632	610	651	687	620	573	506	616	598
Psychology	2,864	2,832	2,806	2,729	2,737	2,992	3,018	2,986	3,159	3,137	3,169
Social sciences	2,342	2,347	2,215	2,201	2,173	2,258	2,390	2,401	2,524	2,691	2,716
Non-science and -engineering, total	10,629	10,503	10,507	10,414	10,435	11,240	11,509	12,016	12,105	12,693	12,949
Health	585	603	646	692	756	756	839	855	939	1,050	1,045
Humanities [1]	1,999	2,665	2,672	2,759	2,716	3,082	3,194	3,440	3,512	3,765	4,053
Education	5,906	5,802	5,665	5,477	5,410	5,788	5,781	5,985	5,940	6,050	5,895
Professional/other	2,139	1,433	1,524	1,486	1,553	1,614	1,695	1,736	1,714	1,828	1,956
Grand total, all fields	24,694	24,519	24,562	24,913	25,026	26,603	27,418	27,956	28,675	30,877	31,910
White											
Science and engineering, total	12,169	12,151	12,052	12,456	12,501	13,170	13,323	13,326	13,735	13,890	13,879
Engineering, total	1,188	1,354	1,458	1,655	1,726	1,840	1,837	1,880	2,025	2,020	2,086
Chemical	211	227	266	317	345	318	322	284	295	259	256
Civil	130	152	158	183	191	196	159	166	168	199	194
Electrical	259	319	283	363	405	450	478	487	553	548	588
Mechanical	176	210	230	253	241	286	266	326	328	337	334
Other engineering	412	446	521	539	544	590	612	617	681	677	714
Sciences, total	10,981	10,797	10,594	10,801	10,775	11,330	11,486	11,446	11,710	11,870	11,793
Physical sciences, total	1,906	1,875	1,956	1,948	1,828	2,008	1,968	1,973	1,911	2,025	1,921
Astronomy	77	79	69	93	74	86	83	95	100	97	111
Chemistry	1,243	1,209	1,267	1,258	1,188	1,284	1,239	1,219	1,145	1,179	1,110
Physics	580	571	606	577	555	618	633	641	656	736	686
Other physical sciences	6	16	14	20	11	20	13	18	10	13	14
Earth, atmospheric, and ocean sciences	425	397	394	480	498	494	557	485	455	504	464
Mathematics	350	343	319	332	369	372	419	425	476	479	535

See explanatory information and SOURCES at end of table.

Appendix table 4-39. Science and engineering doctorates, by field and race/ethnicity: 1985-1995

Page 2 of 4

Field and race/ethnicity	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Computer sciences	177	194	229	265	319	339	355	378	410	401	453
Biological sciences	2,913	2,888	2,759	2,966	2,904	2,975	3,041	3,068	3,146	3,108	3,116
Agricultural sciences	659	557	554	518	570	601	545	493	438	487	473
Psychology	2,591	2,548	2,516	2,445	2,453	2,648	2,652	2,636	2,805	2,731	2,715
Social sciences	1,960	1,995	1,867	1,847	1,834	1,893	1,949	1,988	2,069	2,135	2,116
Non-science and -engineering, total	9,137	9,085	9,070	9,005	9,069	9,709	9,856	10,273	10,292	10,695	10,729
Health	502	524	553	606	684	662	720	735	800	867	835
Humanities [1]	1,772	2,401	2,363	2,471	2,399	2,766	2,821	3,061	3,109	3,282	3,520
Education	4,994	4,923	4,820	4,668	4,634	4,901	4,883	5,025	4,942	5,035	4,779
Professional/other	1,869	1,237	1,334	1,260	1,352	1,380	1,432	1,452	1,441	1,511	1,595
Grand total, all fields	21,306	21,236	21,122	21,461	21,570	22,879	23,179	23,599	24,027	24,585	24,608
Asian											
Science and engineering, total	809	816	925	916	986	1,009	1,180	1,344	1,610	2,989	3,666
Engineering, total	281	262	327	332	361	359	405	451	527	867	1,031
Chemical	60	58	60	67	77	51	50	54	62	96	101
Civil	26	26	34	27	36	28	30	34	41	69	91
Electrical	63	71	78	103	93	115	140	175	199	304	322
Mechanical	58	31	61	57	66	69	62	78	93	179	189
Other engineering	74	76	94	78	89	96	123	110	132	219	328
Sciences, total	528	554	598	584	625	650	775	893	1,083	2,122	2,635
Physical sciences, total	152	147	143	138	156	164	172	226	265	600	751
Astronomy	2	6	1	5	2	5	0	4	4	10	22
Chemistry	112	110	108	85	96	99	122	134	157	332	416
Physics	36	31	34	47	57	58	50	88	103	255	312
Other physical sciences	2	0	0	1	1	2	0	0	1	3	1
Earth, atmospheric, and ocean sciences	19	14	18	14	23	15	17	27	22	89	104
Mathematics	33	28	41	33	24	27	57	52	79	142	208
Computer sciences	17	37	26	44	52	48	66	86	77	117	138
Biological sciences	151	168	170	171	201	200	261	269	370	720	924
Agricultural sciences	24	22	38	30	23	32	24	37	29	72	78
Psychology	44	42	48	47	55	53	59	59	73	109	121
Social sciences	88	96	114	107	91	111	119	137	168	273	311
Non-science and -engineering, total	261	245	243	319	282	297	351	417	402	556	634
Health	35	30	35	30	22	39	44	52	45	94	94
Humanities [1]	35	42	53	64	79	62	81	99	108	151	193
Education	98	95	95	130	102	104	130	142	141	172	174
Professional/other	93	78	60	95	79	92	96	124	108	139	173
Grand total, all fields	1,070	1,061	1,168	1,235	1,268	1,306	1,531	1,761	2,012	3,545	4,300

See explanatory information and SOURCES at end of table.

Appendix table 4-39. Science and engineering doctorates, by field and race/ethnicity: 1985-1995

Page 3 of 4

Field and race/ethnicity	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Black											
Science and engineering, total	374	339	319	361	366	373	459	407	468	496	557
Engineering, total	34	24	25	31	33	40	55	49	50	54	71
Chemical	6	4	4	7	5	10	8	13	6	8	3
Civil	4	4	4	1	5	1	12	3	5	8	11
Electrical	8	4	3	7	9	8	16	17	15	17	24
Mechanical	3	3	3	1	5	5	3	5	3	7	14
Other engineering	13	9	11	15	9	16	16	11	21	14	19
Sciences, total	340	315	294	330	333	333	404	358	418	442	486
Physical sciences, total	27	27	20	34	31	30	31	25	41	46	43
Astronomy	0	0	2	0	0	1	0	1	2	0	1
Chemistry	23	18	13	22	26	24	22	17	31	34	33
Physics	4	8	5	12	5	5	9	6	7	11	9
Other physical sciences	0	1	0	0	0	0	0	1	1	1	0
Earth, atmospheric, and ocean sciences	4	0	2	3	4	3	3	6	4	6	3
Mathematics	7	6	11	4	8	4	11	4	8	11	5
Computer sciences	3	1	2	2	1	1	8	5	6	10	11
Biological sciences	53	48	60	48	56	50	60	61	74	75	105
Agricultural sciences	16	16	13	20	14	15	17	14	16	22	17
Psychology	105	111	93	105	97	115	130	106	119	124	150
Social sciences	125	106	93	114	122	115	144	137	150	148	152
Non-science and -engineering, total	669	617	591	609	596	676	701	706	809	778	898
Health	23	21	31	32	29	32	40	38	59	46	60
Humanities [1]	52	67	73	76	71	72	92	90	98	107	114
Education	505	464	417	417	432	496	471	499	555	519	610
Professional/other	89	65	70	84	64	76	98	79	97	106	114
Grand total, all fields	1,043	956	910	970	962	1,049	1,160	1,113	1,277	1,274	1,455
Hispanic											
Science and engineering, total	296	345	357	397	382	468	492	513	542	548	568
Engineering, total	22	35	34	63	47	54	60	71	66	66	77
Chemical	2	4	11	5	9	8	11	16	10	7	13
Civil	7	7	1	13	8	9	5	7	12	14	11
Electrical	4	9	6	14	14	13	15	17	17	21	15
Mechanical	3	6	5	7	3	5	9	11	5	8	8
Other engineering	6	9	11	24	13	19	20	20	22	16	30
Sciences, total	274	310	323	334	335	414	432	442	476	482	491
Physical sciences, total	30	41	56	63	59	72	65	72	79	90	73
Astronomy	0	2	0	2	2	2	1	4	2	2	4
Chemistry	17	25	44	48	43	57	46	42	51	59	43
Physics	13	13	12	13	14	13	18	26	26	29	26
Other physical sciences	0	1	0	0	0	0	0	0	0	0	0

See explanatory information and SOURCES at end of table.

Appendix table 4-39. Science and engineering doctorates, by field and race/ethnicity: 1985-1995

Page 4 of 4

Field and race/ethnicity	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Earth, atmospheric, and ocean sciences	6	4	5	7	9	13	16	16	13	8	12
Mathematics	12	12	11	4	11	10	9	12	16	13	15
Computer sciences	6	7	4	2	4	5	12	8	7	7	6
Biological sciences	59	66	62	76	71	89	95	102	114	131	126
Agricultural sciences	12	17	15	21	18	23	15	18	20	25	21
Psychology	69	90	95	93	93	109	122	133	131	133	145
Social sciences	80	73	75	68	70	93	98	81	96	75	93
Non-science and -engineering, total	338	334	351	296	312	369	375	396	431	481	487
Health	14	12	11	13	11	17	16	13	24	25	30
Humanities [1]	91	91	114	102	100	127	136	129	145	167	153
Education	190	204	201	158	171	190	189	214	222	241	255
Professional/other	43	27	25	23	30	35	34	40	40	48	49
Grand total, all fields	634	679	708	693	694	837	867	909	973	1,029	1,055
American Indian											
Science and engineering, total	41	52	53	44	53	43	56	69	43	64	69
Engineering, total	1	6	7	4	7	4	6	11	2	6	10
Chemical	0	0	1	2	1	0	1	1	1	1	2
Civil	0	0	1	1	1	2	1	1	0	0	0
Electrical	1	2	3	0	0	0	2	4	0	1	2
Mechanical	0	2	1	1	0	0	1	1	0	0	2
Other engineering	0	2	1	0	5	2	1	4	1	4	4
Sciences, total	40	46	46	40	46	39	50	58	41	58	59
Physical sciences, total	3	5	7	6	10	3	10	12	5	6	9
Astronomy	0	0	0	0	2	0	0	0	1	0	0
Chemistry	2	5	6	5	5	3	9	6	2	4	7
Physics	1	0	1	1	3	0	1	6	2	2	2
Other physical sciences	0	0	0	0	0	0	0	0	0	0	0
Earth, atmospheric, and ocean sciences	1	2	0	2	6	1	3	1	4	1	0
Mathematics	0	1	0	2	0	1	0	2	1	2	2
Computer sciences	0	0	3	1	2	0	1	2	1	1	0
Biological sciences	13	17	11	6	7	4	10	13	7	16	15
Agricultural sciences	4	0	2	6	2	4	4	0	1	1	2
Psychology	10	9	16	7	11	19	13	15	15	12	14
Social sciences	9	12	7	10	8	7	9	13	7	19	17
Non-science and -engineering, total	55	47	62	50	41	54	76	80	77	78	79
Health	2	6	3	5	3	1	5	5	6	6	9
Humanities [1]	6	6	10	4	7	6	10	18	10	20	18
Education	40	26	41	36	25	37	56	50	51	36	40
Professional/other	7	9	8	5	6	10	5	7	10	16	12
Grand total, all fields	96	99	115	94	94	97	132	149	120	142	148

[1] Categories differ from those published by other Federal sponsors and the National Research Council in that linguistics, history of science, American studies, and archaeology are included not in humanities but in social science.

NOTE: Details may not add to totals because of persons with unknown race/ethnicity.

SOURCE: National Science Foundation/SRS, Survey of Earned Doctorates.

Appendix table 4-40. Total doctorates awarded to U.S. citizens and permanent residents, by major field, sex and race/ethnicity: 1985-1995

Page 1 of 2

Sex, race/ethnicity, and field	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
All sexes, all races											
Science and engineering, total	14,065	14,016	14,055	14,499	14,591	15,363	15,909	15,940	16,570	18,184	18,961
Engineering, total	1,594	1,726	1,913	2,146	2,229	2,346	2,474	2,520	2,697	3,053	3,336
Sciences, total	12,471	12,290	12,142	12,353	12,362	13,017	13,435	13,420	13,873	15,131	15,625
Non-science and -engineering, total	10,629	10,503	10,507	10,414	10,435	11,240	11,509	12,016	12,105	12,693	12,949
Grand total, all fields	24,694	24,519	24,562	24,913	25,026	26,603	27,418	27,956	28,675	30,877	31,910
Men, all races											
Science and engineering, total	9,881	9,649	9,631	9,888	9,670	10,182	10,313	10,363	10,546	11,691	12,069
Engineering, total	1,458	1,564	1,739	1,950	1,954	2,070	2,158	2,192	2,349	2,605	2,818
Sciences, total	8,423	8,085	7,892	7,938	7,716	8,112	8,155	8,171	8,197	9,086	9,251
Non-science and -engineering, total	5,341	5,057	5,060	5,001	4,864	5,174	5,290	5,430	5,418	5,677	5,746
Grand total, all fields	15,222	14,706	14,691	14,889	14,534	15,356	15,603	15,793	15,964	17,368	17,815
Men, American Indian											
Science and engineering, total	21	33	32	29	33	25	37	42	25	40	44
Engineering, total	1	5	7	4	5	4	4	8	2	4	10
Sciences, total	20	28	25	25	28	21	33	34	23	36	34
Non-science and -engineering, total	19	25	30	23	16	27	37	40	35	31	37
Grand total, all fields	40	58	62	52	49	52	74	82	60	71	81
Men, Asian											
Science and engineering, total	620	621	694	694	745	757	806	926	1,079	2,169	2,557
Engineering, total	260	247	305	314	327	326	356	390	466	748	863
Sciences, total	360	374	389	380	418	431	450	536	613	1,421	1,694
Non-science and -engineering, total	146	145	130	176	160	152	166	208	203	300	311
Grand total, all fields	766	766	824	870	905	909	972	1,134	1,282	2,469	2,868
Men, black											
Science and engineering, total	236	187	189	224	213	225	266	237	260	282	289
Engineering, total	30	20	24	27	30	34	47	43	39	41	56
Sciences, total	206	167	165	197	183	191	219	194	221	241	233
Non-science and -engineering, total	260	244	247	219	239	254	282	280	317	270	319
Grand total, all fields	496	431	436	443	452	479	548	517	577	552	608
Men, Hispanic											
Science and engineering, total	182	227	216	248	227	290	306	308	320	318	336
Engineering, total	22	32	29	57	39	45	50	56	54	60	66
Sciences, total	160	195	187	191	188	245	256	252	266	258	270
Non-science and -engineering, total	168	146	166	137	149	159	152	174	197	199	200
Grand total, all fields	350	373	382	385	376	449	458	482	517	517	536
Men, white											
Science and engineering, total	8,525	8,333	8,222	8,428	8,213	8,648	8,584	8,623	8,723	8,731	8,670
Engineering, total	1,082	1,218	1,314	1,492	1,502	1,614	1,602	1,640	1,764	1,715	1,766
Sciences, total	7,443	7,115	6,908	6,936	6,711	7,034	6,982	6,983	6,959	7,016	6,904
Non-science and -engineering, total	4,656	4,391	4,388	4,368	4,215	4,513	4,564	4,642	4,608	4,825	4,815
Grand total, all fields	13,181	12,724	12,610	12,796	12,428	13,161	13,148	13,265	13,331	13,556	13,485

See explanatory information, if any, and SOURCE at end of table.

Appendix table 4-40. Total doctorates awarded to U.S. citizens and permanent residents, by major field, sex and race/ethnicity: 1985-1995

Sex, race/ethnicity, and field	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Women, all races											
Science and engineering, total	4,184	4,367	4,424	4,611	4,921	5,181	5,596	5,577	6,024	6,493	6,892
Engineering, total	136	162	174	196	275	276	316	328	348	448	518
Sciences, total	4,048	4,205	4,250	4,415	4,646	4,905	5,280	5,249	5,676	6,045	6,374
Non-science and -engineering, total	5,288	5,446	5,447	5,413	5,571	6,066	6,219	6,586	6,687	7,016	7,203
Grand total, all fields	9,472	9,813	9,871	10,024	10,492	11,247	11,815	12,163	12,711	13,509	14,095
Women, American Indian											
Science and engineering, total	20	19	21	15	20	18	19	27	18	24	25
Engineering, total	0	1	0	0	2	0	2	3	0	2	0
Sciences, total	20	18	21	15	18	18	17	24	18	22	25
Non-science and -engineering, total	36	22	32	27	25	27	39	40	42	47	42
Grand total, all fields	56	41	53	42	45	45	58	67	60	71	67
Women, Asian											
Science and engineering, total	189	195	231	222	241	252	374	418	531	820	1,109
Engineering, total	21	15	22	18	34	33	49	61	61	119	168
Sciences, total	168	180	209	204	207	219	325	357	470	701	941
Non-science and -engineering, total	115	100	113	143	122	145	185	209	199	256	323
Grand total, all fields	304	295	344	365	363	397	559	627	730	1,076	1,432
Women, black											
Science and engineering, total	138	152	130	137	153	148	193	170	208	214	268
Engineering, total	4	4	1	4	3	6	8	6	11	13	15
Sciences, total	134	148	129	133	150	142	185	164	197	201	253
Non-science and -engineering, total	409	373	344	390	357	422	419	426	492	508	579
Grand total, all fields	547	525	474	527	510	570	612	596	700	722	847
Women, Hispanic											
Science and engineering, total	114	118	141	149	155	178	186	205	222	230	232
Engineering, total	0	3	5	6	8	9	10	15	12	6	11
Sciences, total	114	115	136	143	147	169	176	190	210	224	221
Non-science and -engineering, total	170	188	185	159	163	210	223	222	234	282	287
Grand total, all fields	284	306	326	308	318	388	409	427	456	512	519
Women, white											
Science and engineering, total	3,644	3,818	3,830	4,028	4,288	4,522	4,739	4,703	5,012	5,159	5,209
Engineering, total	106	136	144	163	224	226	235	240	261	305	320
Sciences, total	3,538	3,682	3,686	3,865	4,064	4,296	4,504	4,463	4,751	4,854	4,889
Non-science and -engineering, total	4,481	4,694	4,682	4,637	4,854	5,196	5,292	5,631	5,684	5,870	5,914
Grand total, all fields	8,125	8,512	8,512	8,665	9,142	9,718	10,031	10,334	10,696	11,029	11,123

NOTE: Details may not add to totals because of persons whose race/ethnicity is unknown.

SOURCE: National Science Foundation/SRS, Survey of Earned Doctorates.

Appendix table 4-41. Doctorates in science and engineering awarded to U.S. citizens and permanent residents, by field, primary mechanism of support, and race/ethnicity: 1995

Field and primary mechanism of support	Total	White	Asian	Black	Hispanic	American Indian	Unknown race
Total, science and engineering							
All mechanisms	18,961	13,879	3,666	557	568	69	222
Fellowship/traineeship	2,038	1,499	278	131	96	12	22
Research assistantship	5,460	3,703	1,518	59	106	16	58
Teaching assistantship	2,596	1,900	576	40	54	8	18
Other sources, unknown	8,867	6,777	1,294	327	312	33	124
Physical sciences							
All mechanisms	2,840	1,921	751	43	73	9	43
Fellowship/traineeship	189	144	18	11	12	2	2
Research assistantship	1,268	858	355	4	25	6	20
Teaching assistantship	478	312	141	5	17	0	3
Other sources, unknown	905	607	237	23	19	1	18
Earth, atmospheric, and ocean sciences							
All mechanisms	593	464	104	3	12	0	10
Fellowship/traineeship	33	27	4	0	2	0	0
Research assistantship	249	178	64	0	4	0	3
Teaching assistantship	62	54	8	0	0	0	0
Other sources, unknown	249	205	28	3	6	0	7
Mathematical and computer sciences							
All mechanisms	1,388	988	346	16	21	2	15
Fellowship/traineeship	93	76	6	4	4	1	2
Research assistantship	261	182	73	0	3	0	3
Teaching assistantship	463	307	145	4	4	0	3
Other sources, unknown	571	423	122	8	10	1	7
Agricultural sciences							
All mechanisms	598	473	78	17	21	2	7
Fellowship/traineeship	34	25	2	5	2	0	0
Research assistantship	274	209	53	3	5	1	3
Teaching assistantship	26	23	1	0	2	0	0
Other sources, unknown	264	216	22	9	12	1	4
Biological sciences							
All mechanisms	4,321	3,116	924	105	126	15	35
Fellowship/traineeship	896	663	172	26	28	1	6
Research assistantship	1,342	883	382	25	39	6	7
Teaching assistantship	448	341	86	9	10	0	2
Other sources, unknown	1,635	1,229	284	45	49	8	20
Psychology							
All mechanisms	3,169	2,715	121	150	145	14	24
Fellowship/traineeship	205	137	6	33	24	4	1
Research assistantship	365	327	17	12	7	0	2
Teaching assistantship	337	301	20	8	4	3	1
Other sources, unknown	2,262	1,950	78	97	110	7	20
Social sciences							
All mechanisms	2,716	2,116	311	152	93	17	27
Fellowship/traineeship	339	249	36	30	15	4	5
Research assistantship	286	235	41	3	6	0	1
Teaching assistantship	552	431	86	12	13	5	5
Other sources, unknown	1,539	1,201	148	107	59	8	16
Engineering							
All mechanisms	3,336	2,086	1,031	71	77	10	61
Fellowship/traineeship	249	178	34	22	9	0	6
Research assistantship	1,415	831	533	12	17	3	19
Teaching assistantship	230	131	89	2	4	0	4
Other sources, unknown	1,442	946	375	35	47	7	32

See explanatory notes and SOURCES at end of table.

Appendix table 4-41. Doctorates in science and engineering awarded to U.S. citizens and permanent residents, by field, primary mechanism of support, and race/ethnicity: 1995

Page 2 of 2

Field and primary mechanism of support	Total	White	Asian	Black	Hispanic	American Indian	Unknown race
Percentage distribution:							
Total, science and engineering							
All mechanisms	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Fellowship/traineeship	10.7	10.8	7.6	23.5	16.9	17.4	9.9
Research assistantship	28.8	26.7	41.4	10.6	18.7	23.2	26.1
Teaching assistantship	13.7	13.7	15.7	7.2	9.5	11.6	8.1
Other sources, unknown	46.8	48.8	35.3	58.7	54.9	47.8	55.9
Physical sciences							
All mechanisms	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Fellowship/traineeship	6.7	7.5	2.4	25.6	16.4	22.2	4.7
Research assistantship	44.6	44.7	47.3	9.3	34.2	66.7	46.5
Teaching assistantship	16.8	16.2	18.8	11.6	23.3	0.0	7.0
Other sources, unknown	31.9	31.6	31.6	53.5	26.0	11.1	41.9
Earth, atmospheric, and ocean sciences							
All mechanisms	100.0	100.0	100.0	100.0	100.0	0.0	100.0
Fellowship/traineeship	5.6	5.8	3.8	0.0	16.7	0.0	0.0
Research assistantship	42.0	38.4	61.5	0.0	33.3	0.0	30.0
Teaching assistantship	10.5	11.6	7.7	0.0	0.0	0.0	0.0
Other sources, unknown	42.0	44.2	26.9	100.0	50.0	0.0	70.0
Mathematical and computer sciences							
All mechanisms	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Fellowship/traineeship	6.7	7.7	1.7	25.0	19.0	50.0	13.3
Research assistantship	18.8	18.4	21.1	0.0	14.3	0.0	20.0
Teaching assistantship	33.4	31.1	41.9	25.0	19.0	0.0	20.0
Other sources, unknown	41.1	42.8	35.3	50.0	47.6	50.0	46.7
Agricultural sciences							
All mechanisms	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Fellowship/traineeship	5.7	5.3	2.6	29.4	9.5	0.0	0.0
Research assistantship	45.8	44.2	67.9	17.6	23.8	50.0	42.9
Teaching assistantship	4.3	4.9	1.3	0.0	9.5	0.0	0.0
Other sources, unknown	44.1	45.7	28.2	52.9	57.1	50.0	57.1
Biological sciences							
All mechanisms	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Fellowship/traineeship	20.7	21.3	18.6	24.8	22.2	6.7	17.1
Research assistantship	31.1	28.3	41.3	23.8	31.0	40.0	20.0
Teaching assistantship	10.4	10.9	9.3	8.6	7.9	0.0	5.7
Other sources, unknown	37.8	39.4	30.7	42.9	38.9	53.3	57.1
Psychology							
All mechanisms	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Fellowship/traineeship	6.5	5.0	5.0	22.0	16.6	28.6	4.2
Research assistantship	11.5	12.0	14.0	8.0	4.8	0.0	8.3
Teaching assistantship	10.6	11.1	16.5	5.3	2.8	21.4	4.2
Other sources, unknown	71.4	71.8	64.5	64.7	75.9	50.0	83.3
Social sciences							
All mechanisms	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Fellowship/traineeship	12.5	11.8	11.6	19.7	16.1	23.5	18.5
Research assistantship	10.5	11.1	13.2	2.0	6.5	0.0	3.7
Teaching assistantship	20.3	20.4	27.7	7.9	14.0	29.4	18.5
Other sources, unknown	56.7	56.8	47.6	70.4	63.4	47.1	59.3
Engineering							
All mechanisms	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Fellowship/traineeship	7.5	8.5	3.3	31.0	11.7	0.0	9.8
Research assistantship	42.4	39.8	51.7	16.9	22.1	30.0	31.1
Teaching assistantship	6.9	6.3	8.6	2.8	5.2	0.0	6.6
Other sources, unknown	43.2	45.3	36.4	49.3	61.0	70.0	52.5

NOTE: Because of rounding, details may not add to totals.

SOURCE: National Science Foundation/SRS. Survey of Earned Doctorates 1995

Appendix table 4-42. Recipients of science and engineering doctorates, by disability status: 1989-1995, selected years

Page 1 of 1

Disability status	1989	1993	1994	1995
Total, science and engineering	21,731	25,441	26,202	26,515
Number reporting disability	200	331	373	355
Percentage reporting disability	0.9	1.3	1.4	1.3
Science	17,188	19,743	20,380	20,508
Number reporting disability	175	286	314	292
Percentage reporting disability	1.0	1.4	1.5	1.4
Engineering	4,543	5,698	5,822	6,007
Number reporting disability	25	45	59	63
Percentage reporting disability	0.6	0.8	1.0	1.0

NOTE: Because survey forms differed prior to 1989 and in 1990 and 1991, and because some respondents in 1992 filled out the 1991 form, data for those years are not included in the table.

SOURCE: National Science Foundation/SRS. Survey of Earned Doctorates.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 4-43. Recipients of science and engineering doctorates, by major field and disability status: 1995

Page 1 of 1

Major field	All recipients		Recipients with disabilities		Recipients without disabilities	
	Number	Percent	Number	Percent	Number	Percent
Total, science and engineering	26,515	100.0	355	100.0	26,160	100.0
Total, science	20,508	77.3	292	82.3	20,216	77.3
Psychology	3,419	12.9	72	20.3	3,347	12.8
Social sciences	3,877	14.6	70	19.7	3,807	14.6
Physical sciences[1]	4,618	17.4	50	14.1	4,568	17.5
Mathematics and statistics	1,190	4.5	10	2.8	1,180	4.5
Computer science	998	3.8	13	3.7	985	3.8
Agricultural/biological sciences	6,406	24.2	77	21.7	6,329	24.2
Total, engineering	6,007	22.7	63	17.7	5,944	22.7

[1] Includes earth, atmospheric, and ocean sciences.

SOURCE: National Science Foundation/SRS. Survey of Earned Doctorates 1995.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 4-44. Doctorate recipients, by disability status and type of disability: 1989 and 1995

Page 1 of 1

Disability status and type	1989	1995
Total, all recipients	21,731	26,515
Persons without disabilities	21,531	26,160
Persons with disabilities	200	355
Auditory	35	45
Orthopedic	46	95
Visual	59	97
Vocal	3	5
Other or more than one handicap	42	86
Unspecified handicap	15	27

SOURCE: National Science Foundation/SRS. Survey of Earned Doctorates.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 4-45. Doctorate recipients in science and engineering, by sex and type of disability: 1995

Page 1 of 1

Disability status and type	Total	Men	Women
Total, all recipients	26,515	18,242	8,273
Persons without disabilities	26,160	18,008	8,152
Persons with disabilities	355	234	121
Auditory	45	34	11
Orthopedic	95	61	34
Visual	97	70	27
Vocal	5	3	2
Other or more than one handicap	86	48	38
Unspecified handicap	27	18	9

SOURCE: National Science Foundation/SRS. Survey of Earned Doctorates 1995.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 4-46. Years between bachelor's and doctoral degrees for scientists and engineers, by disability status and sex: 1995

Page 1 of 1

Years between degrees	Total recipients			Recipients with disabilities			Recipients without disabilities		
	Total	Men	Women	Total	Men	Women	Total	Men	Women
Total	26,515	18,242	8,273	355	234	121	26,160	18,008	8,152
0 to 5	2,259	1,583	676	18	14	4	2,241	1,569	672
6 to 10	12,956	8,965	3,991	149	103	46	12,807	8,862	3,945
11 to 15	6,454	4,620	1,834	88	61	27	6,366	4,559	1,807
16 to 20	2,035	1,304	731	40	24	16	1,995	1,280	715
21 or more years	1,533	819	714	54	28	26	1,479	791	688
Unknown	1,278	951	327	6	4	2	1,272	947	325
Percentage distribution:									
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
0 to 5	8.5	8.7	8.2	5.1	6.0	3.3	8.6	8.7	8.2
6 to 10	48.9	49.1	48.2	42.0	44.0	38.0	49.0	49.2	48.4
11 to 15	24.3	25.3	22.2	24.8	26.1	22.3	24.3	25.3	22.2
16 to 20	7.7	7.1	8.8	11.3	10.3	13.2	7.6	7.1	8.8
21 or more years	5.8	4.5	8.6	15.2	12.0	21.5	5.7	4.4	8.4
Unknown	4.8	5.2	4.0	1.7	1.7	1.7	4.9	5.3	4.0

NOTE: Total includes persons with unknown or unreported disability status.

SOURCE: National Science Foundation/SRS. Survey of Earned Doctorates 1995.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 4-47. Years between bachelor's and doctoral degrees for scientists and engineers, by citizenship status and race/ethnicity of U.S. citizens and permanent residents: 1995

Years	Total	Total non-permanent residents	Total U.S. citizens and permanent residents	White, non-Hispanic	Asian	Black, non-Hispanic	Hispanic	American Indian	Unknown or unreported
Total	26,515	7,554	18,961	13,879	3,666	557	568	69	222
1 to 5	2,259	482	1,777	1,500	169	35	44	8	21
6 to 10	12,956	3,690	9,266	7,052	1,552	223	298	36	105
11 to 15	6,454	1,977	4,477	2,659	1,485	148	122	14	49
16 to 20	2,035	418	1,617	1,265	192	82	51	6	21
More than 20	1,533	136	1,397	1,181	101	56	42	5	12
Unknown	1,278	851	427	222	167	13	11	0	14
Percent distribution									
1 to 5	8.5	6.4	9.4	10.8	4.6	6.3	7.7	11.6	9.5
6 to 10	48.9	48.8	48.9	50.8	42.3	40.0	52.5	52.2	47.3
11 to 15	24.3	26.2	23.6	19.2	40.5	26.6	21.5	20.3	22.1
16 to 20	7.7	5.5	8.5	9.1	5.2	14.7	9.0	8.7	9.5
More than 20	5.8	1.8	7.4	8.5	2.8	10.1	7.4	7.2	5.4
Unknown	4.8	11.3	2.3	1.6	4.6	2.3	1.9	0.0	6.3

NOTE: Data for non-resident aliens include doctorate recipients whose citizenship is unknown.

SOURCE: National Science Foundation/SRS. Survey of Earned Doctorates 1995.

Appendix table 5-1. Scientists and engineers in the labor force, by occupation, sex, and highest degree: 1995

Page 1 of 1

Occupation	Total		Bachelor's		Master's		Doctorate	
	Women	Men	Women	Men	Women	Men	Women	Men
Total science and engineering	728,000	2,528,200	385,300	1,498,000	237,600	678,100	95,800	329,900
Computer/mathematical sciences	279,100	687,100	189,600	445,800	79,500	194,100	9,800	44,800
Computer science	240,900	613,900	178,500	426,700	58,500	166,000	3,600	18,900
Mathematical science	12,700	25,800	5,400	11,200	5,700	8,600	1,600	6,100
Postsecondary computer/ mathematics teachers	25,500	47,400	5,600	7,900	15,300	19,500	4,600	19,900
Life sciences	108,800	202,700	47,800	76,100	28,600	36,600	27,700	76,700
Agricultural/food science	11,600	32,600	7,600	17,300	2,500	7,100	1,500	8,200
Biological sciences	69,900	102,900	32,500	38,800	16,100	17,500	17,800	41,700
Environmental science	2,900	17,800	2,000	12,000	800	5,100	100	700
Postsecondary life science teachers	24,400	49,400	5,800	8,000	9,300	7,000	8,300	26,200
Physical sciences	60,900	220,900	34,300	96,700	16,900	52,900	9,800	70,900
Chemistry	29,700	84,200	19,600	46,700	6,100	14,800	4,000	22,600
Earth/geology/oceanography	13,300	59,800	6,700	30,400	5,300	20,100	1,300	9,300
Physics and astronomy	3,500	26,600	1,000	6,400	1,600	6,500	800	13,700
Other physical sciences	4,700	12,600	3,100	6,200	1,300	3,900	300	2,400
Postsecondary physical science teachers	9,700	37,700	3,800	7,200	2,600	7,600	3,300	22,800
Social sciences	160,600	160,900	32,000	29,600	81,300	56,700	43,000	70,900
Economics	9,600	24,500	4,100	7,200	4,000	11,600	1,500	5,600
Political science	4,000	5,000	2,100	3,000	1,600	1,100	300	900
Psychology	102,700	66,300	16,800	9,100	60,300	29,600	22,800	25,600
Sociology/anthropology	7,700	8,600	3,300	4,500	3,200	2,300	1,300	1,800
Other social science	6,300	6,400	1,800	2,000	2,200	2,700	1,400	1,600
Postsecondary social science teachers	30,200	50,100	3,800	3,800	10,100	9,400	15,700	35,300
Engineering	118,600	1,256,600	81,700	849,800	31,400	337,800	5,500	66,600
Aerospace engineering	4,600	70,600	2,900	41,000	1,500	25,300	200	4,200
Chemical engineering	9,400	63,500	6,300	40,300	2,200	17,700	900	5,500
Civil engineering	18,500	184,500	14,000	131,700	4,100	48,600	300	3,600
Electrical engineering	23,300	346,300	16,400	233,400	6,300	98,400	500	13,400
Industrial engineering	9,600	62,300	7,100	46,800	2,400	14,700	100	800
Mechanical engineering	15,000	246,200	10,300	185,100	4,000	53,300	700	7,400
Other engineering	35,900	254,000	24,500	166,300	9,800	72,200	1,600	15,200
Postsecondary engineering teachers	2,400	29,100	200	5,100	1,000	7,500	1,200	16,400

NOTES: Because of rounding, details may not add to totals. Total includes "professional and other degrees."
Scientists and engineers are defined in terms of field of employment not degree field.

SOURCE: National Science Foundation/SRS 1995 SESTAT Integrated Data Files.

Appendix table 5-2. Employed scientists and engineers, by sex, race/ethnicity, disability status, and age: 1995

Page 1 of 1

Sex, race/ethnicity, and disability status	Total	Less than 30	30-39	40-49	50 or over
Total	3,185,600	430,900	1,124,000	954,500	676,100
Sex					
Women	713,500	129,700	277,500	209,300	97,000
Men	2,472,100	301,200	846,600	745,200	579,100
Race/ethnicity					
Hispanic	90,100	14,900	41,900	20,100	13,200
White, non-Hispanic	2,673,600	344,400	919,600	819,000	590,600
Black, non-Hispanic	107,500	21,000	39,000	31,100	16,400
Asian	304,600	49,600	119,900	81,500	53,600
American Indian	8,000	1,100	2,900	2,100	1,900
Other	1,700	-	700	600	500
Disability status					
Persons without disabilities	3,031,200	423,800	1,094,700	898,000	614,700
Persons with disabilities	154,300	7,100	29,300	56,500	61,400
Percentage distribution:					
Total	100.0	13.5	35.3	30.0	21.2
Sex					
Women	100.0	18.2	38.9	29.3	13.6
Men	100.0	12.2	34.2	30.1	23.4
Race/ethnicity					
Hispanic	100.0	16.5	46.5	22.3	14.7
White, non-Hispanic	100.0	12.9	34.4	30.6	22.1
Black, non-Hispanic	100.0	19.5	36.3	28.9	15.3
Asian	100.0	16.3	39.4	26.8	17.6
American Indian	100.0	13.8	36.3	26.3	23.8
Other	100.0	-	39.7	33.1	27.2
Disability status					
Persons without disabilities	100.0	14.0	36.1	29.6	20.3
Persons with disabilities	100.0	4.6	19.0	36.6	39.8

KEY: - = Fewer than 50 estimated.

NOTES: Because of rounding, details may not add up to totals.
Scientists and engineers are defined in terms of field of employment not degree field.

SOURCE: National Science Foundation/SRS 1995 SESTAT Integrated Data Files.

Appendix table 5-3. Employment status of scientists and engineers, by age, sex, and race/ethnicity: 1995

Page 1 of 1

Age, sex, and race/ethnicity	Employment status: Total	Full-time employed in field	Full-time employed outside field	Part-time employed	Not employed	Not in labor force
All ages	3,708,400	2,656,700	285,900	243,000	70,600	452,200
Women	835,500	524,600	71,700	117,100	14,500	107,500
Men	2,872,900	2,132,100	214,100	125,800	56,100	344,800
White	3,138,900	2,218,400	246,200	209,000	54,600	410,600
Asian	338,100	264,500	21,200	19,000	10,600	22,900
Black	119,100	87,600	11,700	8,200	2,700	8,900
Hispanic	102,000	77,600	6,300	6,200	2,600	9,300
American Indian	8,600	7,000	400	600	100	500
Younger than 35	1,051,800	827,900	58,400	91,400	16,000	58,200
Women	305,100	209,500	16,700	43,300	4,800	30,900
Men	746,700	618,400	41,700	48,100	11,200	27,300
White	841,600	668,600	47,000	70,400	11,100	44,600
Asian	124,100	93,500	6,400	13,100	3,000	8,100
Black	42,900	32,600	3,100	4,200	600	2,400
Hispanic	40,400	30,800	1,800	3,500	1,300	3,000
American Indian	2,700	2,300	100	200	-	100
35 to 44	1,146,900	922,500	108,400	54,700	18,900	42,600
Women	292,600	183,200	29,700	39,600	6,200	34,000
Men	854,300	739,300	78,700	15,100	12,700	8,600
White	961,900	766,700	95,400	48,900	14,400	36,300
Asian	107,300	91,200	7,200	3,000	2,800	3,200
Black	38,900	32,300	3,200	1,200	1,200	900
Hispanic	34,600	28,700	2,300	1,400	300	1,900
American Indian	3,000	2,500	200	100	100	100
45 to 54	776,300	612,700	87,100	37,000	16,400	23,000
Women	161,900	104,200	20,000	23,600	2,300	11,800
Men	614,400	508,500	67,100	13,400	14,100	11,200
White	667,800	526,400	74,700	33,900	13,100	19,600
Asian	68,700	56,300	6,400	1,100	2,600	2,300
Black	23,400	16,600	4,300	1,400	500	700
Hispanic	14,900	12,100	1,700	600	200	300
American Indian	1,500	1,300	-	100	-	100
55 or older	733,500	293,700	32,000	59,800	19,300	328,500
Women	75,900	27,800	5,400	10,600	1,200	30,800
Men	657,600	265,900	26,600	49,200	18,100	297,700
White	667,600	256,700	29,100	55,800	16,000	310,100
Asian	38,000	23,500	1,200	1,800	2,200	9,300
Black	13,900	6,100	1,100	1,300	300	5,000
Hispanic	12,100	6,000	500	700	800	4,000
American Indian	1,400	900	100	200	-	200

KEY: - = Fewer than 50 estimated.

NOTE: Because of rounding, details may not add to totals. Scientists and engineers are defined in terms of field of employment not degree field.

SOURCE: National Science Foundation/SRS. 1995 SESTAT Integrated Data Files.

Appendix table 5-4. Scientists and engineers who are unemployed or out of the labor force, by reason for not working, sex, race/ethnicity, and disability status: 1995

Page 1 of 1

Reason for not working	Total	Sex		Race/ethnicity					Disability status	
		Women	Men	White	Asian	Black	Hispanic	American Indian	Persons without Disabilities	Persons with Disabilities
Total	522,800	122,000	400,900	465,200	33,500	11,600	11,800	600	441,900	80,900
Family responsibilities	53,400	49,100	4,300	46,400	4,600	700	1,500	100	51,600	1,700
Chronic illness or permanent disability	27,300	5,300	22,000	24,300	1,700	700	500	100	10,000	17,300
Suitable job not available	38,000	10,000	28,000	29,200	5,800	1,200	1,800	-	34,100	3,900
Did not need or want to work	52,500	28,500	24,000	46,800	3,400	900	1,300	-	49,800	2,700
Other reason	42,000	17,600	24,400	36,500	2,600	1,400	1,500	100	38,300	3,700
Retired	326,400	25,600	300,800	308,300	9,400	4,900	3,700	200	265,400	61,000
Student	49,800	17,700	32,100	34,500	9,300	2,300	3,600	200	48,400	1,500
On layoff from a job	36,900	6,300	30,600	29,000	5,800	1,100	1,000	-	33,600	3,300
Percentage distribution:										
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Family responsibilities	10.2	40.2	1.1	10.0	13.7	6.0	12.7	16.7	11.7	2.1
Chronic illness or permanent disability	5.2	4.3	5.5	5.2	5.1	6.0	4.2	16.7	2.3	21.4
Suitable job not available	7.3	8.2	7.0	6.3	17.3	10.3	15.3	-	7.7	4.8
Did not need or want to work	10.0	23.4	6.0	10.1	10.1	7.8	11.0	-	11.3	3.3
Other reason	8.0	14.4	6.1	7.8	7.8	12.1	12.7	16.7	8.7	4.6
Retired	62.4	21.0	75.0	66.3	28.1	42.2	31.4	33.3	60.1	75.4
Student	9.5	14.5	8.0	7.4	27.8	19.8	30.5	33.3	11.0	1.9
On layoff from a job	7.1	5.2	7.6	6.2	17.3	9.5	8.5	-	7.6	4.1

KEY: - = Fewer than 50 estimated.

NOTES: Because of rounding and because respondents could select more than one reason, details may not add to totals. Total includes "other" race/ethnicity. Scientists and engineers are defined in terms of field of employment not degree field.

SOURCE: National Science Foundation/SRS 1995 SESTAT Integrated Data Files.

Appendix table 5-5. Employed scientists and engineers who are working outside their field, by most important reason for working outside field, sex, and occupation: 1995

Reason for working outside field	Total	Sex		Race/ethnicity					Disability status	
		Women	Men	White	Asian	Black	Hispanic	American Indian	Persons without disability	Persons with disability
Total	303,900	81,100	222,800	262,400	22,200	12,200	6,600	500	286,100	17,800
Pay, promotion opportunities	109,500	30,000	79,500	95,000	6,300	5,300	2,800	100	102,700	6,800
Working conditions	18,200	3,700	14,400	14,100	2,800	900	300	-	16,700	1,400
Job location	17,400	4,900	12,500	15,200	1,300	600	200	-	16,700	700
Change in career or professional interests	69,900	18,700	51,200	63,200	4,100	1,100	1,500	-	67,200	2,700
Family-related reasons	11,100	5,700	5,400	9,700	700	300	400	100	10,400	700
Job in field not available	48,700	13,000	35,700	40,400	4,900	2,500	600	200	44,900	3,800
Other reason	29,200	5,100	24,100	24,800	2,000	1,500	800	100	27,600	1,600

KEY: - = Fewer than 50 estimated.

NOTES: Because of rounding, details may not add up to totals. Total includes "other" race/ethnicity.
Scientists and engineers are defined in terms of field of employment not degree field.

SOURCE: National Science Foundation/SRS 1995 SESTAT Integrated Data Files.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 5-6. Part-time employed scientists and engineers, by reason for part-time status, sex, race/ethnicity, and disability status: 1995

Page 1 of 1

Reason for part-time	Total	Sex		Race/ethnicity					Disability status	
		Women	Men	White	Asian	Black	Hispanic	American Indian	Persons without Disability	Persons with Disability
Total	243,000	117,100	125,800	209,000	19,000	8,200	6,200	600	227,700	15,300
Family responsibilities	58,300	49,600	8,700	53,400	2,600	1,000	1,200	100	56,900	1,400
Chronic illness or permanent disability	4,800	2,600	2,200	4,100	200	-	500	-	3,000	1,800
Did not need or want to work full-time	93,800	53,700	40,100	85,500	4,700	1,900	1,400	200	88,000	5,800
Suitable full-time job not available	38,900	14,600	24,200	32,200	4,100	1,300	1,100	100	36,100	2,800
Other reason	31,400	13,500	17,900	26,400	2,200	1,800	900	100	29,400	2,100
Retired	43,900	4,800	39,100	41,800	700	700	600	100	37,500	6,400
Student	79,800	30,800	49,000	59,900	12,400	4,400	2,900	100	78,000	1,800

KEY: - = Fewer than 50 estimated.

NOTES: Because of rounding and because respondents could select more than one reason, details may not add up to totals. Total includes "other" race/ethnicity. Scientists and engineers are defined in terms of field of employment not degree field.

SOURCE: National Science Foundation/SRS 1995 SESTAT Integrated Data Files.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 5-7. Employed scientists and engineers, by occupation, employment sector, sex, race/ethnicity, and disability status: 1995

Occupation and employment sector	Total	Sex		Race/ethnicity					Disability status	
		Women	Men	White	Asian	Black	Hispanic	American Indian	Persons without disability	Persons with disability
Science and engineering total										
Total	3,185,500	713,400	2,472,100	2,673,700	304,600	107,500	90,100	8,000	3,031,200	154,400
College/university	291,100	80,400	210,700	234,100	37,800	9,000	9,300	900	280,000	11,100
Other educational institution	275,200	108,200	167,000	228,900	21,500	15,400	8,800	500	256,500	18,700
Business/industry, for profit	1,970,300	355,900	1,614,400	1,663,000	195,900	54,800	51,700	4,300	1,884,600	85,700
Self-employed	113,800	36,300	77,500	106,100	4,300	1,200	1,800	300	106,600	7,200
Private not-for-profit	91,000	38,100	52,900	76,800	7,100	3,600	3,000	500	85,300	5,800
Federal government	252,400	47,500	204,900	210,800	17,900	13,700	8,800	1,100	238,900	13,500
State or local government	191,700	47,000	144,700	154,000	20,100	9,800	6,700	400	179,300	12,400
Computer and mathematical sciences										
Total	949,600	274,900	674,500	784,900	100,300	39,300	22,900	1,600	903,200	46,100
College/university	41,000	8,900	32,000	30,500	7,400	1,700	1,200	100	39,500	1,400
Other educational institution	83,000	36,200	46,800	71,400	4,700	4,400	2,100	200	76,900	6,100
Business/industry, for profit	683,200	187,600	495,500	565,200	77,200	24,200	15,600	1,000	653,000	30,200
Self-employed	23,600	6,200	17,500	21,900	1,300	100	400	-	22,200	1,400
Private not-for-profit	27,600	10,700	16,900	22,300	3,100	1,000	1,100	100	26,400	1,200
Federal government	53,300	11,700	41,500	43,800	3,300	4,700	1,400	100	49,600	3,600
State or local government	37,900	13,600	24,300	29,800	3,300	3,200	1,100	100	35,600	2,200
Life and related sciences										
Total	305,300	106,000	199,300	257,200	29,100	9,800	8,400	600	293,100	12,200
College/university	84,300	28,700	55,600	69,800	9,500	2,200	2,600	100	81,100	3,300
Other educational institution	64,700	26,700	38,000	51,700	7,400	3,400	2,200	100	61,700	3,000
Business/industry, for profit	75,600	27,200	48,400	63,900	7,700	2,100	1,900	100	72,900	2,700
Self-employed	7,400	2,100	5,300	7,100	200	-	-	-	7,200	200
Private not-for-profit	11,000	5,600	5,400	9,000	1,300	400	300	-	10,800	100
Federal government	37,700	10,000	27,700	33,900	1,800	1,200	600	200	36,100	1,600
State or local government	24,600	5,700	18,900	21,800	1,200	500	800	100	23,300	1,300
Physical and related sciences										
Total	274,300	59,100	215,300	232,700	26,300	7,700	6,800	700	260,100	14,200
College/university	51,100	9,300	41,800	42,400	6,000	1,200	1,400	100	49,600	1,600
Other educational institution	28,500	6,300	22,200	24,300	3,000	500	700	-	24,800	3,700
Business/industry, for profit	138,600	31,800	106,800	117,100	13,100	4,400	3,500	600	132,400	6,200
Self-employed	6,500	300	6,200	6,000	400	-	-	-	5,900	500
Private not-for-profit	5,600	1,100	4,500	4,700	700	-	200	-	5,500	100
Federal government	27,600	6,500	21,200	24,400	1,500	800	800	-	27,000	700
State or local government	16,400	3,800	12,600	13,800	1,600	800	200	-	14,900	1,400

See explanatory information and SOURCES at end of table.

Appendix table 5-7. Employed scientists and engineers, by occupation, employment sector, sex, race/ethnicity, and disability status: 1995

Page 2 of 2

Occupation and employment sector	Total	Sex		Race/ethnicity					Disability status	
		Women	Men	White	Asian	Black	Hispanic	American Indian	Persons without disability	Persons with disability
Social and related sciences										
Total	317,500	158,600	158,900	277,900	11,600	16,600	9,800	1,500	298,600	18,900
College/university	71,900	29,100	42,700	61,700	4,300	2,900	2,500	400	68,200	3,700
Other educational institution	67,600	37,100	30,500	56,500	2,500	5,900	2,500	200	64,000	3,600
Business/industry, for profit	57,600	28,500	29,100	51,500	2,200	2,100	1,700	100	55,100	2,500
Self-employed	42,600	26,000	16,500	40,700	100	1,000	500	200	39,700	2,800
Private not-for-profit	33,700	19,800	13,900	29,400	800	2,200	1,000	300	29,900	3,800
Federal government	17,100	5,500	11,700	15,300	500	700	400	200	16,600	500
State or local government	27,000	12,600	14,500	22,800	1,200	1,800	1,200	100	25,100	2,000
Engineering										
Total	1,338,900	115,000	1,223,900	1,120,900	137,400	34,300	42,100	3,400	1,276,100	62,800
College/university	42,800	4,400	38,500	29,600	10,600	1,000	1,500	100	41,600	1,200
Other educational institution	31,400	1,900	29,500	25,100	3,900	1,200	1,200	-	29,000	2,400
Business/industry, for profit	1,015,200	80,700	934,500	865,400	95,800	22,100	29,000	2,400	971,200	44,000
Self-employed	33,800	1,800	32,000	30,300	2,400	100	900	100	31,600	2,200
Private not-for-profit	13,200	900	12,200	11,400	1,200	100	400	100	12,700	500
Federal government	116,600	13,900	102,700	93,300	10,700	6,300	5,600	600	109,600	7,000
State or local government	85,900	11,400	74,500	65,800	12,800	3,500	3,500	100	80,400	5,500

KEY: - = Fewer than 50 estimated.

NOTES: Because of rounding, details may not add up to totals. Total includes "other" race/ethnicity. Scientists and engineers are defined in terms of field of employment not degree

SOURCE: National Sciences Foundation/SRS 1995 SESTAT Integrated Data Files.

Appendix table 5-8. Scientists and engineers employed in academic institutions, by institutional type, highest degree, sex, race/ethnicity, and disability status: 1995

Page 1 of 1

Highest degree and type of institution	Total	Sex: Women	Sex: Men	Race/ethnicity: White	Race/ethnicity: Asian	Race/ethnicity: Black	Race/ethnicity: Hispanic	Race/ethnicity: American Indian	Disability status: Persons without disability	Disability status: Persons with disability
All degrees	566,300	188,600	377,600	462,800	59,200	24,500	18,000	1,600	536,500	30,000
Primary school	20,300	14,400	5,900	16,200	700	2,200	1,100	100	19,500	800
Secondary school	13,200	5,600	7,500	11,100	500	1,200	300	-	12,300	900
2-year college	57,500	22,700	34,800	51,000	2,000	2,600	1,800	200	52,200	5,400
4-year college or university	218,000	55,600	162,400	176,900	27,200	6,500	6,700	700	209,900	8,100
Medical school	40,000	16,500	23,500	32,000	5,200	1,600	1,100	100	38,200	1,800
Research institute	33,100	8,300	24,800	25,100	5,400	1,000	1,400	200	31,800	1,300
Other	21,500	9,900	11,600	18,900	1,300	700	600	-	20,000	1,500
Combined 4-year, medical school, or research institute	162,700	55,600	107,100	131,600	16,900	8,700	5,000	300	152,600	10,200
Bachelors	149,300	57,900	91,400	122,400	11,800	8,900	6,000	200	144,200	5,100
Primary school	3,000	1,700	1,300	1,500	200	900	300	-	2,900	100
Secondary school	4,700	1,900	2,800	3,500	500	500	100	-	4,700	-
2-year college	13,100	4,100	9,000	12,000	400	600	-	-	12,300	700
4-year college or university	47,600	17,700	29,900	38,700	4,600	2,000	2,100	100	47,200	400
Medical school	8,500	5,100	3,400	6,900	600	800	200	-	8,000	600
Research institute	7,300	2,900	4,400	5,600	800	500	400	-	7,200	100
Other	9,000	5,100	3,900	7,900	500	400	300	-	8,000	1,000
Combined 4-year, medical school, or research institute	56,200	19,600	36,600	46,300	4,200	3,200	2,500	100	54,000	2,200
Masters	174,700	73,900	100,700	142,300	18,600	8,200	5,100	400	162,800	11,800
Primary school	15,200	11,400	3,800	12,800	500	1,100	700	100	14,500	600
Secondary school	7,300	3,100	4,200	6,600	-	500	200	-	6,600	700
2-year college	35,300	15,700	19,600	30,900	1,000	1,600	1,600	200	31,000	4,300
4-year college or university	36,200	11,300	24,900	25,600	8,100	1,200	1,200	100	35,600	600
Medical school	3,400	1,900	1,500	2,000	1,000	200	100	-	3,300	100
Research institute	6,300	1,700	4,500	4,300	1,400	200	200	-	6,000	300
Other	8,400	3,500	4,900	7,500	400	300	200	-	8,000	400
Combined 4-year, medical school, or research institute	62,700	25,300	37,400	52,500	6,100	3,000	900	-	57,800	4,800
Doctorate	226,600	53,500	173,100	185,400	27,800	6,200	6,300	800	183,700	7,900
Primary school	1,600	1,100	500	1,400	-	200	-	-	1,600	100
Secondary school	1,000	500	500	800	-	100	100	-	800	200
2-year college	8,100	2,500	5,600	7,000	500	400	200	-	7,700	400
4-year college or university	134,000	26,500	107,400	112,500	14,300	3,200	3,400	500	126,800	7,100
Medical school	27,900	9,300	18,600	22,900	3,600	500	800	100	26,800	1,100
Research institute	19,400	3,700	15,700	15,100	3,100	300	800	100	18,500	900
Other	3,400	1,100	2,400	3,000	300	-	100	-	3,400	100
Combined 4-year, medical school, or research institute	31,200	8,800	22,400	22,800	5,800	1,500	1,000	100	29,000	2,200

KEY: - = Fewer than 50 estimated.

NOTES: Because of rounding, details may not add up to totals. All degrees includes "other" degree. Total includes "other" race/ethnicity. Scientists and engineers are defined in terms of field of employment not degree field.

SOURCE: National Science Foundation/SRS 1995 SESTAT Integrated Data Files.

Appendix table 5-9. Full-time ranked doctoral science and engineering faculty at 4-year colleges and universities, by academic rank, age, sex, race/ethnicity, and disability status: 1995

Page 1 of 1

Age and rank	Total	Sex		Race/ethnicity					Disability status	
		Women	Men	White	Asian	Black	Hispanic	American Indian	Persons without disability	Persons with disability
All ages/All ranks	135,200	24,900	110,100	115,000	12,500	3,200	3,600	700	127,600	7,600
Professor	60,400	6,000	54,300	53,600	4,400	800	1,100	400	56,000	4,400
Associate professor	40,000	7,900	32,000	33,800	3,700	1,200	1,100	200	37,700	2,300
Assistant professor	34,800	11,000	23,800	27,600	4,400	1,200	1,400	100	33,900	900
Younger than age 35	9,900	2,800	7,000	7,600	1,600	200	400	-	9,700	200
Professor	100	-	-	-	-	-	-	-	100	-
Associate professor	800	100	700	600	200	-	-	-	800	-
Assistant professor	9,000	2,700	6,300	7,000	1,400	200	400	-	8,800	200
Age 35 to 44	44,600	10,500	34,000	36,700	5,100	1,100	1,500	200	43,300	1,200
Professor	5,800	700	5,000	4,900	700	100	100	-	5,600	200
Associate professor	18,400	3,600	14,800	15,400	1,900	300	600	100	17,700	600
Assistant professor	20,400	6,200	14,200	16,400	2,500	700	800	100	20,000	400
Age 45 to 54	46,100	8,100	37,900	40,600	3,100	1,200	1,000	200	43,300	2,800
Professor	26,500	3,200	23,200	23,800	1,700	300	500	200	24,900	1,600
Associate professor	15,000	3,100	11,900	13,100	1,000	600	300	-	14,000	1,000
Assistant professor	4,600	1,800	2,800	3,700	400	300	200	-	4,400	200
Age 55 or older	34,700	3,500	31,100	30,300	2,700	800	500	300	31,300	3,300
Professor	28,100	2,000	26,000	24,900	2,000	500	400	200	25,500	2,600
Associate professor	5,800	1,200	4,600	4,800	500	300	100	100	5,100	600
Assistant professor	800	300	500	600	200	-	-	-	700	100

KEY: - = Fewer than 50 estimated.

NOTES: Because of rounding, details may not add up to totals. Total includes "other" race/ethnicity.
Scientists and engineers are defined in terms of field of employment not degree field.

SOURCE: National Science Foundation/SRS 1995 SESTAT Integrated Data Files.

Appendix table 5-10. Full-time doctoral scientists and engineers employed at 4-year colleges and universities, by tenure status, age, sex, race/ethnicity, and disability status: 1995

Page 1 of 1

Age and tenure	Total	Sex: Women	Sex: Men	Race/ethnicity: White	Race/ethnicity: Asian	Race/ethnicity: Black	Race/ethnicity: Hispanic	Race/ethnicity: American Indian	Disability status: Persons without disability	Disability status: Persons with disability
All ages	170,400	35,700	134,700	141,500	19,700	3,800	4,600	600	161,800	8,600
No tenure system at institution	5,800	1,100	4,700	4,400	1,000	100	200	-	5,500	200
No tenure system for my position	26,600	8,000	18,600	20,400	5,000	500	700	-	25,900	800
Tenured	91,800	12,500	79,300	80,600	6,900	1,800	1,900	500	85,700	6,100
On tenure track, not tenured	30,700	8,900	21,800	24,100	3,900	1,200	1,400	100	29,800	900
Not on tenure track	15,500	5,200	10,300	12,000	2,900	200	400	-	14,900	600
Younger than age 35	21,100	6,700	14,300	15,600	4,400	200	700	-	20,600	400
No tenure system at institution	800	200	500	600	200	-	-	-	800	-
No tenure system for my position	8,300	2,900	5,400	6,000	2,000	100	200	-	8,100	100
Tenured	600	100	500	400	200	-	-	-	600	-
On tenure track, not tenured	7,600	2,200	5,400	6,000	1,100	100	300	-	7,400	200
Not on tenure track	3,800	1,300	2,500	2,600	900	-	200	-	3,700	100
Age 35 to 44	59,100	15,000	44,300	46,900	8,400	1,400	2,100	200	57,500	1,500
No tenure system at institution	2,300	500	1,800	1,800	400	-	100	-	2,300	-
No tenure system for my position	11,400	3,500	7,900	8,200	2,500	300	400	-	11,100	300
Tenured	20,500	3,800	16,800	17,400	2,100	300	600	100	19,900	600
On tenure track, not tenured	18,300	5,000	13,300	14,400	2,200	700	800	100	17,800	400
Not on tenure track	6,600	2,200	4,500	5,100	1,200	100	200	-	6,400	200
Age 45 to 54	52,700	10,000	42,700	45,900	3,900	1,400	1,200	200	49,400	3,300
No tenure system at institution	2,000	300	1,700	1,500	300	100	100	-	1,900	100
No tenure system for my position	4,500	1,300	3,200	3,900	400	100	100	-	4,200	300
Tenured	38,200	5,700	32,500	34,200	2,200	800	800	200	35,900	2,300
On tenure track, not tenured	4,300	1,500	2,800	3,300	400	300	200	-	4,000	300
Not on tenure track	3,700	1,200	2,500	3,000	600	100	-	-	3,400	300
Age 55 or older	37,600	4,000	33,600	33,100	3,000	800	500	200	34,000	3,500
No tenure system at institution	700	100	600	600	100	-	-	-	600	100
No tenure system for my position	2,500	300	2,200	2,300	200	-	-	-	2,400	100
Tenured	32,400	2,900	29,500	28,600	2,400	700	500	200	29,200	3,200
On tenure track, not tenured	600	200	400	400	100	100	-	-	500	-
Not on tenure track	1,400	500	900	1,200	200	-	-	-	1,300	100

KEY: - = Fewer than 50 estimated.

NOTES: Because of rounding, details may not add up to totals. Total includes "other" race/ethnicity. Scientists and engineers are defined in terms of field of employment not degree field.

SOURCE: National Science Foundation/SRS 1995 SESTAT Integrated Data Files.

Appendix table 5-11. Full-time doctoral scientists and engineers employed in 4-year colleges or universities, by number of refereed publications and patents since 1990, sex, race, and disability status: 1995

Sex, race/ethnicity, and disability status	Total	Publications since 1990						Patents since 1990 [1]	
		None	1 or 2	3 to 5	6 to 10	11 to 20	More than 20	No	Yes
Total	159,300	27,900	26,100	32,000	33,400	25,600	14,200	103,600	12,200
Sex									
Women	30,600	5,200	6,400	7,500	6,300	4,000	1,200	16,600	1,200
Men	128,700	22,700	19,700	24,600	27,100	21,600	13,000	86,900	11,000
Race/Ethnicity									
Hispanic	4,100	600	800	900	1,000	600	300	2,700	300
White	134,400	24,300	21,400	27,100	28,100	21,400	12,100	86,700	9,600
Black	3,600	1,000	900	900	500	300	100	2,100	200
Asian	16,400	2,000	2,900	2,900	3,800	3,200	1,700	11,900	2,000
American Indian	600	100	200	200	100	100	-	300	-
Disability status									
Persons without disability	150,300	25,800	24,700	30,400	31,700	24,300	13,400	98,100	11,600
Persons with disability	8,900	2,000	1,500	1,700	1,700	1,300	800	5,500	600

[1] Patents columns include only natural scientists and engineers.

KEY: - = Fewer than 50 estimated.

NOTES: Includes only those who received doctorates in 1990 or earlier. Because of rounding, details may not add up to totals. Total includes "other" race/ethnicity. Scientists and engineers are defined in terms of field of employment not degree field.

SOURCE: National Science Foundation/SRS 1995 SESTAT Integrated Data Files.

Appendix table 5-12. Full-time doctoral scientists and engineers employed in 4-year colleges or universities, by support from federal grants or contracts, sex, race/ethnicity, and disability status: 1995

Support from federal grants or contracts	Total	Sex		Race/ethnicity					Disability status	
		Women	Men	White	Asian	Black	Hispanic	American Indian	Persons without disability	Persons with disability
Total	202,800	44,900	157,900	165,500	25,600	5,200	5,700	800	192,100	10,700
No	112,000	25,400	86,700	92,100	13,000	3,400	2,900	600	105,400	6,700
Yes	90,800	19,600	71,200	73,400	12,600	1,800	2,800	200	86,700	4,100

NOTES: Because of rounding, details may not add up to totals. Total includes "other" race/ethnicity.
Scientists and engineers are defined in terms of field of employment not degree field.

SOURCE: National Science Foundation/SRS 1995 SESTAT Integrated Data Files.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 5-13. Scientists and engineers employed in business or industry, by primary work activity, age, sex, race/ethnicity, and disability status: 1995

Primary work activity and age	All	Sex		Race/ethnicity					Disability status	
		Women	Men	White	Asian	Black	Hispanic	American Indian	Persons without disability	Persons with disability
Total	1,849,800	333,600	1,516,300	1,558,700	186,500	51,800	48,900	4,000	1,773,700	75,900
Research and development	699,100	92,700	606,400	587,000	74,700	16,900	18,600	1,800	670,900	28,100
Teaching	10,900	4,700	6,200	9,800	400	400	200	100	10,600	200
Management/administration	391,200	60,100	331,200	343,200	25,600	11,100	10,600	800	372,300	18,900
Computer applications	538,300	127,600	410,700	438,800	67,500	17,700	13,400	1,000	517,800	20,600
Other	210,300	48,500	161,800	179,900	18,300	5,700	6,100	300	202,100	8,100
Younger than 35										
Research and development	246,900	48,200	198,700	202,400	27,400	8,100	8,600	400	240,900	6,000
Teaching	2,800	1,400	1,400	2,400	100	200	100	-	2,800	-
Management/administration	115,300	27,200	88,100	98,500	8,000	4,400	3,800	600	113,400	1,900
Computer applications	200,500	50,900	149,500	157,000	29,800	7,600	5,600	600	196,600	3,800
Other	62,300	19,400	42,900	52,500	5,200	2,400	2,100	200	61,200	1,100
35 to 44										
Research and development	251,000	30,700	220,300	212,400	25,500	5,400	6,500	1,000	242,000	9,100
Teaching	4,400	1,900	2,400	4,000	100	100	100	100	4,300	100
Management/administration	136,700	23,100	113,600	120,100	8,500	4,300	3,800	100	133,000	3,700
Computer applications	211,200	51,200	160,000	174,700	24,000	6,400	6,000	200	204,500	6,600
Other	70,700	15,500	55,200	60,000	5,600	2,100	2,800	100	68,600	2,100
45 to 54										
Research and development	131,500	11,100	120,400	110,900	15,500	2,600	2,500	100	125,000	6,600
Teaching	2,700	1,300	1,400	2,500	200	-	-	-	2,500	200
Management/administration	95,800	8,200	87,600	84,600	6,700	2,200	2,300	100	85,700	10,100
Computer applications	98,100	21,400	76,800	81,900	11,200	3,300	1,400	200	89,800	8,300
Other	50,500	10,600	39,800	43,800	4,800	1,100	600	-	48,700	1,800
55 or older										
Research and development	69,600	2,700	66,900	61,300	6,300	700	1,100	200	63,100	6,500
Teaching	1,000	-	1,000	900	-	100	-	-	1,000	-
Management/administration	43,400	1,600	41,900	40,100	2,300	200	800	100	40,300	3,200
Computer applications	28,600	4,200	24,400	25,300	2,500	400	300	100	26,800	1,800
Other	26,900	3,000	23,900	23,600	2,600	100	500	100	23,700	3,100

KEY: - = Fewer than 50 estimated.

NOTES: Because of rounding, details may not add up to totals. Total includes "other" race/ethnicity. Scientists and engineers are defined in terms of field of employment not degree field.

SOURCE: National Science Foundation/SRS 1995 SESTAT Integrated Data Files.

Appendix table 5-14. Mean number of direct and indirect subordinates for supervisory[1] scientists and engineers employed in business or industry, by age, sex, race/ethnicity, and disability status: 1995

Page 1 of 1

Sex, race/ethnicity, and disability status	Age				
	Total	Younger than 35	35-44	45-54	55 or older
Total	11.0	8.3	10.5	15.3	10.4
Sex					
Women	7.7	7.1	8.9	7.0	4.5
Men	11.5	8.5	10.8	16.5	10.6
Race/ethnicity					
Hispanic	10.6	8.3	10.4	13.9	14.9
White	11.3	8.4	10.8	16.0	10.3
Black	11.4	10.7	12.7	10.4	12.1
Asian	7.5	6.2	6.4	10.1	9.2
American Indian	9.1	8.2	5.6	7.2	21.5
Disability status					
Persons without disability	10.9	8.3	10.4	15.3	10.4
Persons with disability	12.3	4.4	13.0	15.6	10.1

[1] It should be noted that in the SESTAT data files, only first-line supervisors are considered scientists and engineers. Mid-level and top managers and administrators are not considered to be in science and engineering occupations. Because this analysis was limited to people employed as scientists and engineers, those mid-level and top managers and administrators were excluded.

NOTES: Because of rounding, details may not add up to totals. Total includes "other" race/ethnicity. Scientists and engineers are defined in terms of field of employment not degree field.

SOURCE: National Science Foundation/SRS 1995 SESTAT Integrated Data Files.

Appendix table 5-15. Scientists and engineers employed in business or industry, by occupation, size of employer, sex, race/ethnicity, and disability status: 1995

Page 1 of 2

Size of employer	Total	Sex: Women	Sex: Men	Race/ethnicity: White	Race/ethnicity: Asian	Race/ethnicity: Black	Race/ethnicity: Hispanic	Race/ethnicity: American Indian	Disability status: Persons without disability	Disability status: Persons with disability
Total science and engineering	1,849,800	333,500	1,516,200	1,558,700	186,300	51,800	48,900	3,900	1,773,800	75,900
Fewer than 10 employees	70,200	12,400	57,900	60,400	6,600	500	2,400	300	66,800	3,400
10-24	74,800	12,600	62,200	62,500	9,100	1,100	1,800	300	71,200	3,600
25-99	163,400	25,800	137,500	136,100	20,000	2,800	3,900	600	157,200	6,100
100-499	256,000	44,800	211,200	215,200	28,400	5,400	6,600	300	246,700	9,400
500-999	120,100	24,400	95,700	101,400	11,900	3,400	3,300	100	115,700	4,400
1,000-4,999	337,600	66,600	270,900	286,900	30,800	9,800	9,800	200	323,700	13,800
5,000 or more	827,700	146,900	680,800	696,200	79,500	28,800	21,100	2,100	792,500	35,200
Computer and mathematics sciences	644,300	178,000	466,200	532,200	73,600	23,000	14,800	800	617,000	27,300
Fewer than 10 employees	20,400	4,000	16,400	17,500	2,100	200	600	100	19,900	500
10-24	19,200	4,000	15,200	15,300	3,200	300	200	200	18,200	1,000
25-99	48,000	11,700	36,300	38,900	7,500	1,100	600	-	46,000	2,000
100-499	83,700	22,900	60,800	69,500	9,300	2,700	2,200	-	80,700	3,000
500-999	41,100	12,200	28,800	33,900	4,800	1,300	1,100	-	39,400	1,700
1,000-4,999	125,900	39,200	86,700	104,700	13,400	4,800	2,900	-	120,000	5,900
5,000 or more	306,000	84,000	222,000	252,400	33,300	12,600	7,200	500	292,800	13,200
Life and related sciences	71,200	25,500	45,800	59,900	7,400	2,000	1,800	-	68,400	2,500
Fewer than 10 employees	5,100	1,000	4,100	4,700	200	-	100	-	5,000	-
10-24	5,200	2,500	2,700	4,300	800	-	100	-	4,800	400
25-99	8,400	2,400	6,100	7,600	600	300	-	-	8,400	100
100-499	10,000	3,400	6,500	7,900	1,800	-	200	-	9,200	700
500-999	5,000	2,600	2,500	4,300	400	-	400	-	5,000	-
1,000-4,999	12,300	4,500	7,800	10,300	1,200	600	200	-	11,300	900
5,000 or more	25,200	9,100	16,100	20,800	2,400	1,100	800	-	24,700	400
Physical and related sciences	131,500	30,500	101,100	110,800	12,700	4,000	3,200	600	126,000	5,600
Fewer than 10 employees	5,000	900	4,100	4,400	200	-	300	-	4,900	100
10-24	8,000	1,500	6,500	7,100	400	100	300	-	7,600	400
25-99	14,900	3,500	11,400	12,300	1,900	100	500	200	14,100	800
100-499	17,800	4,400	13,400	14,300	2,700	500	300	-	17,300	500
500-999	10,000	2,000	8,100	8,600	400	600	400	100	9,200	900
1,000-4,999	27,500	6,200	21,300	23,900	2,000	700	800	-	26,200	1,300
5,000 or more	48,300	12,000	36,300	40,200	5,100	2,000	600	300	46,700	1,600
Social and related sciences	43,400	21,900	21,400	38,900	1,300	1,700	1,400	-	41,600	1,700
Fewer than 10 employees	8,600	4,400	4,200	7,700	100	200	500	-	8,100	400
10-24	4,300	2,400	1,900	4,100	-	200	-	-	4,300	-
25-99	6,600	3,200	3,400	6,300	-	200	100	-	6,200	500
100-499	9,000	5,200	3,800	8,100	300	500	100	-	8,900	100
500-999	2,600	1,300	1,300	2,400	-	100	-	-	2,000	600
1,000-4,999	3,600	2,500	1,100	3,200	100	100	300	-	3,600	-
5,000 or more	8,700	2,900	5,700	7,100	800	400	400	-	8,500	100

See explanatory information and SOURCES at end of table.

Appendix table 5-15. Scientists and engineers employed in business or industry, by occupation, size of employer, sex, race/ethnicity, and disability status: 1995

Size of employer	Total	Sex		Race/ethnicity					Disability status	
		Women	Men	White	Asian	Black	Hispanic	American Indian	Persons without disability	Persons with disability
Engineering	959,400	77,600	881,600	817,200	91,100	21,000	27,500	2,300	920,500	38,500
Fewer than 10 employees	31,200	2,100	29,100	26,000	4,000	100	900	200	28,800	2,400
10-24	38,100	2,200	35,800	31,700	4,700	400	1,100	100	36,300	1,700
25-99	85,400	5,000	80,400	71,100	10,000	1,200	2,700	400	82,500	2,800
100-499	135,500	8,800	126,700	115,500	14,200	1,700	3,800	200	130,600	4,900
500-999	61,400	6,300	55,000	52,300	6,300	1,300	1,500	-	60,100	1,200
1,000-4,999	168,300	14,200	154,000	144,800	14,100	3,600	5,500	200	162,500	5,700
5,000 or more	439,500	39,000	400,600	375,800	37,800	12,700	12,000	1,200	419,700	19,800

KEY: - = Fewer than 50 estimated.

NOTES: Because of rounding, details may not add up to totals. Total includes "other" race/ethnicity. Scientists and engineers are defined in terms of field of employment not degree field.

SOURCE: National Science Foundation/SRS 1995 SESTAT Integrated Data Files.

Women, Minorities, and Persons with Disabilities in Science and Engineering: 1998

Appendix table: 5-16. Doctoral scientists and engineers employed full time in business or industry and who received degrees in 1990 or earlier, by occupation, number of publications, applications for a U.S. patent, sex, race/ethnicity, and disability status: 1995

Page 1 of 1

Publications and patents	Total	Sex		Race/ethnicity					Physical disability	
		Women	Men	White	Asian	Black	Hispanic	American Indian	Persons without disability	Persons with disability
Publications										
Total, all scientists and engineers	74,500	9,200	65,400	56,100	16,100	900	1,300	100	72,100	2,400
None	34,900	4,500	30,400	26,900	6,900	500	400	100	33,500	1,400
1 or 2	16,500	1,700	14,900	12,000	3,900	200	400	-	16,000	500
3 to 5	11,700	1,700	10,000	9,000	2,500	100	100	-	11,400	300
6 to 10	6,400	700	5,600	4,600	1,500	100	100	-	6,200	200
11 to 20	3,700	500	3,300	2,500	1,000	-	200	-	3,700	-
More than 20	1,300	100	1,200	1,100	200	-	-	-	1,300	-
Patents										
All natural scientists and engineers [1]										
No	43,400	5,700	37,700	32,000	10,100	500	600	-	41,800	1,500
Yes	26,500	2,200	24,200	19,900	5,800	100	600	-	25,900	700
Total	69,900	7,900	61,900	51,900	15,900	600	1,200	-	67,700	2,200
Computer and mathematics sciences										
No	9,400	1,700	7,700	7,200	1,900	100	100	-	9,100	300
Yes	2,100	100	2,000	1,700	400	-	-	-	2,100	100
Total	11,500	1,800	9,700	8,900	2,300	100	100	-	11,200	400
Life and related sciences										
No	8,600	1,900	6,700	7,000	1,500	-	100	-	8,400	300
Yes	4,900	1,000	3,800	3,600	1,000	-	200	-	4,800	100
Total	13,500	2,900	10,500	10,600	2,500	-	300	-	13,200	400
Physical and related sciences										
No	10,700	1,400	9,300	8,400	1,800	200	200	-	10,200	400
Yes	10,700	900	9,800	8,600	1,800	100	200	-	10,400	300
Total	21,400	2,300	19,100	17,000	3,600	300	400	-	20,600	700
Engineering										
No	14,700	700	14,000	9,400	4,900	200	200	-	14,100	500
Yes	8,800	200	8,600	6,000	2,600	-	200	-	8,600	200
Total	23,500	900	22,600	15,400	7,500	200	400	-	22,700	700

[1] The prevalence of patents by social scientists was so low they were excluded from this analysis.

KEY: - = Fewer than 50 estimated.

NOTES: Because of rounding, details may not add up to totals. Total includes "other" race/ethnicity.
Scientists and engineers are defined in terms of field of employment not degree field.

SOURCE: National Science Foundation/SRS 1995 SESTAT Integrated Data Files.

Appendix table 5-17. Median annual salaries of full-time employed scientists and engineers, by highest degree, occupation, sex, and age: 1995

Page 1 of 2

Occupation and age	Sex	Highest degree: All degrees	Bachelor's	Master's	Doctorate
Science and engineering total					
All ages	Women	$42,000	$40,200	$43,500	$47,000
	Men	52,000	50,000	56,000	60,000
20-29	Women	31,500	35,000	42,000	-
	Men	36,000	38,000	42,000	38,600
30-39	Women	43,000	44,000	49,000	45,000
	Men	50,000	49,700	56,000	55,500
40-49	Women	47,000	48,000	53,000	51,300
	Men	58,000	57,000	60,000	60,000
50 or older	Women	49,000	49,600	50,000	58,000
	Men	61,000	57,000	60,000	65,000
Computer and mathematical sciences					
20-29	Women	36,900	35,000	42,000	-
	Men	39,000	38,000	42,000	38,600
30-39	Women	45,000	44,000	49,000	45,000
	Men	50,000	49,700	56,000	55,500
40-49	Women	49,700	48,000	53,000	51,300
	Men	58,100	57,000	60,000	60,000
50 or older	Women	50,000	49,600	50,000	58,000
	Men	60,000	57,000	60,000	65,000
Life and related sciences					
20-29	Women	20,500	20,000	24,200	25,000
	Men	21,000	19,900	24,000	28,000
30-39	Women	32,000	32,200	32,000	32,000
	Men	37,500	36,000	35,000	39,000
40-49	Women	45,000	41,000	36,300	54,000
	Men	48,000	40,000	45,000	58,800
50 or older	Women	43,400	-	40,900	56,000
	Men	60,000	47,000	47,000	67,200
Physical and related sciences					
20-29	Women	28,100	27,500	34,000	-
	Men	25,000	25,000	20,000	34,000
30-39	Women	40,000	38,500	46,000	45,000
	Men	42,000	40,000	41,000	50,000
40-49	Women	45,000	45,000	41,000	56,000
	Men	56,400	50,000	57,800	64,000
50 or older	Women	44,900	-	-	58,000
	Men	63,000	56,400	60,000	72,000

See explanatory information and SOURCES at end of table.

Appendix table 5-17. Median annual salaries of full-time employed scientists and engineers, by highest degree, occupation, sex, and age: 1995

Page 2 of 2

Occupation and age	Sex	Highest degree: All degrees	Bachelor's	Master's	Doctorate
Social and related sciences					
20-29	Women	$22,000	$20,000	$26,000	$34,000
	Men	26,000	25,000	24,500	-
30-39	Women	35,500	24,000	35,000	40,000
	Men	40,000	-	35,000	45,000
40-49	Women	41,000	-	37,000	47,000
	Men	48,000	42,000	40,000	55,000
50 or older	Women	47,400	-	42,500	52,000
	Men	59,000	-	53,000	60,000
Engineering					
20-29	Women	39,000	38,000	42,800	-
	Men	38,400	38,000	42,000	50,000
30-39	Women	49,800	48,000	53,300	57,000
	Men	51,000	50,000	55,000	59,400
40-49	Women	52,000	48,600	60,000	65,000
	Men	60,000	58,500	64,000	70,000
50 or older	Women	57,800	58,000	-	67,000
	Men	63,000	60,500	67,000	75,900

KEY: - = Fewer than 20 individuals reporting salary.

NOTES: Because of rounding, details may not add up to totals. Median salaries were not computed for groups with fewer than 20 individuals reporting salary. Scientists and engineers are defined in terms of field of employment not degree field.

SOURCE: National Science Foundation/SRS 1995 SESTAT Integrated Data Files.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 5-18. Scientists and engineers in the U.S. labor force, by occupation, race/ethnicity, and highest degree: 1995

Occupation	All degrees						Bachelor's					
	Total	White	Asian	Black	Hispanic	American Indian	Total	White	Asian	Black	Hispanic	American Indian
Science and engineering total	3,256,200	2,728,300	315,200	110,200	92,700	8,100	1,883,300	1,616,500	132,200	72,400	56,300	4,800
Computer/mathematical sciences	966,200	797,700	102,500	40,100	23,600	1,700	635,400	539,300	47,500	29,200	17,800	1,100
Computer/information sciences	854,800	705,600	92,600	33,900	21,100	1,300	605,200	514,200	46,100	26,700	17,000	1,100
Mathematical science	38,500	32,000	2,700	2,500	800	100	16,600	14,200	200	1,200	400	-
Postsecondary mathematics	72,900	60,100	7,200	3,600	1,700	300	13,500	10,900	1,100	1,200	300	-
Life and related sciences	311,500	261,900	30,200	9,800	8,800	700	123,900	107,900	7,200	4,300	4,300	300
Agricultural/food science	44,200	38,200	2,700	1,500	1,700	-	24,900	22,000	700	1,100	1,000	-
Biological science	172,800	140,400	22,100	4,900	4,900	400	71,300	60,500	5,200	2,800	2,600	100
Environmental science	20,700	19,800	300	100	300	100	14,000	13,300	200	100	200	100
Postsecondary life science	73,800	63,400	5,100	3,300	1,900	100	13,800	12,000	1,000	300	500	-
Physical and related sciences	281,800	238,100	27,700	8,000	7,100	800	131,000	114,100	7,700	5,600	3,100	500
Chemistry	113,900	90,300	15,200	5,600	2,500	400	66,300	54,900	5,500	4,400	1,300	300
Earth science	73,100	66,300	3,600	700	2,200	300	37,100	34,100	1,300	300	1,100	200
Physics	30,100	25,600	3,700	300	400	-	7,400	6,800	200	200	200	-
Other physical science	17,300	15,300	1,000	300	600	-	9,300	8,600	100	200	400	-
Postsecondary physics	47,400	40,600	4,100	1,100	1,400	100	11,000	9,700	500	600	200	-
Social and related sciences	321,500	281,200	11,900	16,700	10,100	1,500	61,600	50,800	2,600	5,800	2,000	300
Economics	34,100	28,900	2,000	1,200	1,900	100	11,300	10,500	100	400	400	-
Political science	9,000	7,300	800	300	600	-	5,100	4,300	400	200	100	-
Psychology	169,000	151,900	3,200	8,500	4,600	900	25,900	20,500	1,200	2,900	1,100	200
Sociology	16,300	14,800	600	600	200	100	7,800	6,900	300	400	200	100
Other social sciences	12,700	10,700	500	1,100	300	-	3,800	2,900	100	600	100	-
Postsecondary social science	80,300	67,600	4,800	5,000	2,500	400	7,600	5,700	600	1,300	100	-
Engineering	1,375,200	1,149,300	143,000	35,700	43,000	3,400	931,500	804,400	67,300	27,500	29,000	2,500
Aerospace engineering	75,200	64,200	5,900	1,700	3,000	300	43,900	38,100	2,600	1,100	1,800	200
Chemical engineering	72,900	59,700	8,300	2,500	2,400	-	46,600	39,000	4,200	1,800	1,600	-
Civil engineering	203,000	167,300	24,000	3,600	7,600	400	145,700	124,800	12,400	2,900	5,300	300
Electrical engineering	369,600	294,900	48,900	11,900	13,000	900	249,800	205,900	24,900	9,300	8,800	800
Industrial engineering	71,900	62,000	3,900	3,400	2,100	300	53,900	46,700	2,000	3,200	1,700	200
Mechanical engineering	261,200	223,300	23,700	5,900	7,000	800	195,400	173,400	11,100	4,700	5,200	500
Other engineering	289,900	254,300	22,400	5,900	6,700	600	190,800	172,300	9,300	4,300	4,500	500
Postsecondary engineering	31,500	23,600	5,800	900	1,100	100	5,300	4,100	900	200	100	-

See explanatory information and SOURCES at end of table.

Appendix table 5-18. Scientists and engineers in the U.S. labor force, by occupation, race/ethnicity, and highest degree: 1995

Page 2 of 2

Occupation	Master's						Doctorate					
	Total	White	Asian	Black	Hispanic	American Indian	Total	White	Asian	Black	Hispanic	American Indian
Science and engineering total	915,700	743,200	119,500	26,200	24,600	1,800	425,700	342,300	61,300	9,800	10,700	1,500
Computer/mathematical sciences	273,600	214,100	45,100	9,300	4,500	400	54,600	42,200	9,600	1,200	1,400	200
Computer/information sciences	224,500	172,600	41,500	6,500	3,600	100	22,500	16,900	4,700	400	500	100
Mathematical science	14,300	11,900	1,100	1,100	100	100	7,700	5,900	1,400	100	300	-
Postsecondary mathematics	34,800	29,700	2,600	1,700	800	200	24,500	19,400	3,500	700	600	100
Life and related sciences	65,200	54,700	6,500	2,500	1,100	100	104,400	84,700	14,800	1,900	2,800	200
Agricultural/food science	9,600	8,400	700	300	100	-	9,700	7,700	1,300	100	500	-
Biological science	33,600	27,300	4,700	900	500	-	59,500	45,500	11,100	900	1,800	200
Environmental science	5,900	5,700	-	-	100	-	800	800	-	-	-	-
Postsecondary life science	16,300	13,400	1,100	1,300	400	-	34,500	30,600	2,400	900	500	-
Physical and related sciences	69,800	58,000	8,300	1,000	2,200	200	80,700	65,700	11,600	1,400	1,700	200
Chemistry	20,900	15,800	3,900	700	500	100	26,600	19,500	5,800	600	700	-
Earth science	25,400	22,800	1,400	200	900	100	10,600	9,300	900	200	100	-
Physics	8,100	6,900	1,200	-	100	-	14,500	11,900	2,300	100	200	-
Other physical science	5,200	4,300	600	-	200	-	2,700	2,400	300	-	-	-
Postsecondary physics	10,200	8,200	1,300	100	600	-	26,100	22,600	2,300	500	600	100
Social and related sciences	138,000	122,800	3,800	6,200	4,800	400	113,900	100,500	5,400	4,200	3,100	700
Economics	15,600	12,700	1,000	800	1,200	100	7,100	5,700	900	100	400	100
Political science	2,700	1,900	300	-	400	-	1,200	1,000	100	-	100	-
Psychology	89,900	82,500	1,100	3,700	2,200	300	48,400	44,600	900	1,400	1,100	300
Sociology	5,500	5,000	300	100	-	-	3,100	2,900	-	100	-	-
Other social sciences	4,900	4,400	200	200	-	-	3,000	2,500	200	200	200	-
Postsecondary social science	19,500	16,200	900	1,500	1,000	100	51,000	43,800	3,300	2,300	1,300	400
Engineering	369,200	293,600	55,700	7,100	12,000	700	72,100	49,300	19,800	1,100	1,800	200
Aerospace engineering	26,800	22,700	2,300	500	1,200	-	4,400	3,200	1,000	-	100	-
Chemical engineering	19,900	16,300	2,400	500	600	-	6,400	4,500	1,700	100	200	-
Civil engineering	52,700	39,700	10,100	700	2,100	100	3,900	2,200	1,500	100	100	-
Electrical engineering	104,700	79,200	19,200	2,400	3,800	100	13,900	8,800	4,700	100	300	-
Industrial engineering	17,100	14,700	1,700	200	400	100	900	600	200	-	-	-
Mechanical engineering	57,300	44,900	9,600	1,100	1,500	300	8,100	4,800	3,000	100	200	-
Other engineering	82,000	69,600	9,000	1,400	2,000	100	16,800	12,200	4,100	200	300	-
Postsecondary engineering	8,500	6,500	1,300	200	500	-	17,600	13,000	3,600	400	600	100

KEY: - = Fewer than 50 estimated.

NOTES: Because of rounding, details may not add up to totals. All degrees includes "other" degrees. Total includes "other" race/ethnicity. Scientists and engineers are defined in terms of field of employment not degree field.

SOURCE: National Science Foundation/SRS 1995 SESTAT Integrated Data Files.

Appendix table 5-19. Doctoral scientists and engineers in the U.S. labor force, by race/ethnicity, occupation, and citizenship status: 1995

Page 1 of 1

Citizenship and occupation	All	White	Asian	Black	Hispanic	American Indian	Other
Science and engineering total	425,600	342,300	61,300	9,800	10,700	1,500	100
Non-U.S. bom	110,000	45,000	56,800	2,900	5,200	100	-
Computer and mathematical sciences	18,100	7,700	9,200	400	800	100	-
Life and related sciences	26,400	10,900	13,400	600	1,600	-	-
Physical and related sciences	22,300	9,900	10,900	600	800	-	-
Social and related sciences	14,000	7,700	4,300	800	1,100	-	-
Engineering	29,300	8,900	18,900	600	900	-	-
U.S. bom	315,600	297,300	4,500	6,900	5,500	1,300	100
Computer and mathematical sciences	36,500	34,500	400	900	500	100	-
Life and related sciences	78,000	73,800	1,400	1,300	1,200	200	-
Physical and related sciences	58,400	55,900	700	800	900	100	-
Social and related sciences	99,900	92,700	1,100	3,400	1,900	700	-
Engineering	42,800	40,400	900	500	900	100	-

KEY: - = Fewer than 50 estimated.

NOTES: Because of rounding, details may not add up to totals. Scientists and engineers are defined in terms of field of employment not degree field.

SOURCE: National Science Foundation/SRS 1995 SESTAT Integrated Data Files.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 5-20. Employment status of scientists and engineers, by occupation and race/ethnicity: 1995

Page 1 of 1

Occupation and race/ethnicity	Total	Full-time employed in field	Full-time employed outside field	Part-time employed	Not employed	Not in labor force
Science and engineering total	3,708,500	2,656,800	285,800	243,000	70,600	452,300
Hispanic	102,000	77,600	6,300	6,200	2,600	9,300
White	3,138,900	2,218,400	246,200	209,000	54,600	410,600
Black	119,100	87,600	11,700	8,200	2,700	8,900
Asian	338,100	264,500	21,200	19,000	10,600	22,900
American Indian	8,600	7,000	400	600	100	500
Other	1,800	1,700	-	-	-	100
Computer and mathematical sciences	1,037,100	710,700	177,800	61,000	16,800	70,800
Hispanic	25,300	18,400	3,500	1,000	700	1,700
White	860,400	576,200	155,500	53,200	12,900	62,600
Black	42,000	30,100	6,900	2,200	800	1,900
Asian	107,000	84,000	11,800	4,500	2,300	4,500
American Indian	1,700	1,300	100	100	100	100
Other	700	700	-	-	-	-
Life and related sciences	364,700	266,100	9,900	29,300	6,200	53,100
Hispanic	10,600	7,300	200	1,100	300	1,700
White	306,000	223,800	8,500	24,800	4,700	44,100
Black	12,300	8,400	500	800	100	2,500
Asian	34,900	25,700	700	2,600	1,100	4,700
American Indian	700	700	-	-	-	-
Other	200	200	-	-	-	100
Physical and related sciences	331,000	239,300	10,300	24,900	7,500	49,300
Hispanic	8,300	6,100	500	300	300	1,200
White	282,500	202,900	8,300	21,500	5,500	44,400
Black	9,100	6,700	600	500	300	1,100
Asian	30,100	23,000	700	2,500	1,400	2,400
American Indian	1,000	600	200	100	-	200
Other	-	-	-	-	-	-
Social and related sciences	363,800	239,700	5,900	71,600	3,900	42,300
Hispanic	11,600	7,200	300	2,200	400	1,400
White	318,600	210,500	4,900	62,500	3,300	37,400
Black	18,200	12,300	700	3,500	100	1,500
Asian	13,700	8,500	-	3,200	100	1,800
American Indian	1,700	1,200	-	200	-	200
Other	-	-	-	-	-	-
Engineering	1,612,000	1,201,100	81,800	56,100	36,200	236,700
Hispanic	46,300	38,700	1,800	1,700	800	3,300
White	1,371,500	1,005,000	69,000	47,000	28,300	222,100
Black	37,500	30,200	3,000	1,100	1,400	1,800
Asian	152,400	123,300	7,900	6,100	5,700	9,400
American Indian	3,500	3,100	100	200	-	100
Other	800	800	-	-	-	-

KEY: - = Fewer than 50 estimated.

NOTES: Because of rounding, details may not add up to totals.
Scientists and engineers are defined in terms of field of employment not degree field.

SOURCE: National Science Foundation/SRS 1995 SESTAT Integrated Data Files.

Appendix table 5-21. Median annual salaries of full-time employed scientists and engineers, by highest degree, occupation, race/ethnicity, and age: 1995

Page 1 of 1

Occupation and race/ethnicity	All degrees					Bachelor's				Master's				Doctorate			
	All ages	20-29	30-39	40-49	50 or older	20-29	30-39	40-49	50 or older	20-29	30-39	40-49	50 or older	20-29	30-39	40-49	50 or older
Science and engineering total																	
White, non-Hispanic	$50,500	$35,000	$49,500	$56,000	$60,000	$35,000	$48,000	$55,000	$60,000	$37,500	$52,000	$57,800	$60,000	$36,000	$49,000	$60,000	$65,000
Asian	50,000	38,000	48,000	56,000	58,400	35,000	46,000	51,400	53,000	42,000	50,000	59,000	60,000	34,000	50,000	60,000	67,700
Black, non-Hispanic	45,000	35,000	45,000	48,000	50,000	35,000	45,000	46,000	49,900	35,000	45,600	50,000	46,000	40,000	46,000	49,000	58,000
Hispanic	47,000	35,000	45,000	52,000	60,000	33,600	45,000	50,000	60,000	41,500	49,000	52,000	62,000	40,000	44,000	53,300	62,000
American Indian	48,000	34,000	42,000	48,000	60,000	34,000	42,000	48,000	64,000	7,200	42,300	37,000	61,000	-	41,000	50,000	60,000
Computer and mathematical sciences																	
White, non-Hispanic	38,000	38,000	48,000	55,000	56,000	38,000	48,000	55,000	56,000	40,200	55,000	58,300	58,000	36,000	55,000	59,800	63,500
Asian	38,000	38,000	48,700	50,000	45,000	38,000	48,700	50,000	45,000	45,000	54,000	60,000	60,000	-	56,000	55,000	63,000
Black, non-Hispanic	35,000	35,000	44,000	45,800	-	35,000	44,000	45,800	-	39,000	48,000	51,000	-	-	49,000	48,000	58,000
Hispanic	32,000	32,000	45,000	50,000	-	32,000	45,000	50,000	-	-	56,000	-	-	-	47,800	48,000	50,000
American Indian	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Life and related sciences																	
White, non-Hispanic	19,700	19,700	34,500	40,000	47,000	19,700	34,500	40,000	47,000	24,500	35,000	44,000	45,000	28,000	39,000	58,000	65,000
Asian	-	-	-	-	-	-	-	-	-	-	24,000	-	-	24,000	30,000	52,000	67,000
Black, non-Hispanic	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19,600	49,000	50,000
Hispanic	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30,000	61,000	85,000
American Indian	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical and related sciences																	
White, non-Hispanic	27,000	27,000	40,000	48,600	57,500	27,000	40,000	48,600	57,500	25,700	42,000	57,300	60,000	38,000	51,300	64,000	72,000
Asian	27,000	27,000	-	-	-	27,000	-	-	-	29,000	38,000	48,000	-	-	44,000	57,000	65,400
Black, non-Hispanic	30,000	30,000	-	-	-	30,000	-	-	-	-	46,300	-	-	-	47,300	52,500	40,000
Hispanic	20,000	20,000	33,000	-	-	20,000	33,000	-	-	-	37,300	-	-	-	51,000	51,000	69,500
American Indian	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Social and related sciences																	
White, non-Hispanic	20,000	20,000	28,800	40,000	-	20,000	28,800	40,000	-	26,000	35,000	40,000	47,400	42,000	42,000	52,000	60,000
Asian	-	-	-	-	-	-	-	-	-	-	-	-	-	-	45,000	50,900	60,000
Black, non-Hispanic	-	-	-	-	-	-	-	-	-	-	35,000	36,100	-	-	43,000	50,800	59,000
Hispanic	-	-	-	-	-	-	-	-	-	-	36,000	-	-	-	40,000	50,000	53,000
American Indian	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	48,000	50,000
Engineering																	
White, non-Hispanic	38,000	38,000	50,000	58,000	61,000	38,000	50,000	58,000	61,000	42,000	56,000	64,000	68,000	49,000	60,000	70,000	76,800
Asian	38,000	38,000	45,000	53,000	56,000	38,000	45,000	53,000	56,000	40,000	52,000	60,000	60,000	54,000	56,000	67,000	74,900
Black, non-Hispanic	40,000	40,000	48,000	54,300	50,000	40,000	48,000	54,300	50,000	42,000	50,000	65,000	-	-	55,000	69,600	68,000
Hispanic	37,500	37,500	48,000	53,000	62,900	37,500	48,000	53,000	62,900	43,000	52,000	65,000	66,000	-	52,000	55,000	60,000
American Indian	36,000	36,000	48,000	-	-	36,000	48,000	-	-	-	-	-	-	-	-	-	-

KEY: - = Fewer than 20 individuals reporting salary.

NOTES: Because of rounding, details may not add up to totals. Scientists and engineers are defined in terms of field of employment not degree field.

SOURCE: National Science Foudation/SRS 1995 SESTAT Integrated Data Files.

Appendix table 5-22. Scientists and engineers in the U.S. labor force, by occupation, sex, race/ethnicity, and highest degree: 1995

Page 1 of 4

Occupation and highest degree	Total		Hispanic		White		Black		Asian		American Indian	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
All science and engineering	727,800	2,528,200	21,000	70,600	583,400	2,118,500	40,900	67,600	71,300	241,800	2,000	6,000
Bachelor's	385,300	1,498,000	11,800	44,500	311,200	1,305,200	26,300	46,200	35,000	97,300	1,100	3,700
Master's	237,600	678,100	6,500	18,100	194,200	549,000	11,200	15,000	25,000	94,500	600	1,200
Doctorate	95,800	329,900	2,700	8,000	78,000	264,300	3,400	6,400	11,300	50,000	300	1,100
Computer and mathematics sciences	278,900	684,700	6,000	17,500	223,700	571,900	16,900	22,900	31,600	70,700	600	1,100
Bachelor's	189,600	445,800	4,600	13,200	155,000	384,300	12,000	17,200	17,500	30,000	500	700
Master's	79,500	194,100	1,200	3,200	61,500	152,600	4,200	5,100	12,400	32,800	100	200
Doctorate	9,800	44,800	200	1,100	7,200	35,000	700	600	1,700	7,900	-	200
Computer and information science												
Bachelor's	178,500	426,700	4,600	12,500	145,600	368,600	10,800	15,900	17,000	29,100	500	600
Master's	58,500	166,000	600	3,000	44,100	128,500	2,600	4,000	11,200	30,200	-	100
Doctorate	3,600	18,900	100	400	2,400	14,500	300	100	800	3,900	-	-
Mathematical science												
Bachelor's	5,400	11,200	-	400	5,000	9,300	300	900	100	100	-	-
Master's	5,700	8,600	100	-	4,700	7,200	600	500	300	800	-	100
Doctorate	1,600	6,100	-	200	1,300	4,600	-	100	200	1,200	-	-
Postsecondary mathematics												
Bachelor's	5,600	7,900	-	300	4,500	6,400	800	400	400	700	-	-
Master's	15,300	19,500	500	200	12,800	16,900	1,000	700	900	1,700	100	-
Doctorate	4,600	19,900	100	600	3,400	16,000	300	400	700	2,800	-	100
Life and related science	104,100	189,400	3,000	5,300	85,100	162,100	3,900	4,800	11,700	16,800	300	400
Bachelor's	47,800	76,100	1,600	2,700	40,800	67,000	1,900	2,300	3,400	3,800	100	200
Master's	28,600	36,600	600	600	22,600	32,100	1,500	1,000	3,600	2,900	100	-
Doctorate	27,700	76,700	800	2,000	21,700	63,000	500	1,500	4,700	10,100	100	200
Agricultural/food science												
Bachelor's	7,600	17,300	100	800	6,900	15,100	200	1,000	400	300	-	-
Master's	2,500	7,100	100	100	2,200	6,200	-	300	200	500	-	-
Doctorate	1,500	8,200	100	500	1,000	6,700	-	100	400	900	-	-
Biological science												
Bachelor's	32,500	38,800	1,100	1,500	27,100	33,400	1,600	1,200	2,500	2,700	100	100
Master's	16,100	17,500	200	300	12,200	15,100	700	300	2,800	1,900	-	-
Doctorate	17,800	41,700	600	1,200	13,200	32,300	200	700	3,800	7,300	100	100
Environmental science												
Bachelor's	2,000	12,000	-	200	2,000	11,300	-	100	-	200	-	100
Master's	800	5,100	100	-	600	5,000	-	-	-	-	-	-
Doctorate	100	700	-	-	100	700	-	-	-	-	-	-

See explanatory information and SOURCES at end of table.

Appendix table 5-22. Scientists and engineers in the U.S. labor force, by occupation, sex, race/ethnicity, and highest degree: 1995

Occupation and highest degree	Total		Hispanic		White		Black		Asian		American Indian	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
Postsecondary life sciences												
Bachelor's	5,800	8,000	300	200	4,800	7,200	200	100	500	600	-	-
Master's	9,300	7,000	300	100	7,500	5,900	800	500	600	500	-	-
Doctorate	8,300	26,200	200	300	7,400	23,200	200	700	600	1,900	-	-
Physical and related science	61,000	220,500	2,100	5,000	47,000	190,800	3,300	4,800	8,300	19,400	300	600
Bachelor's	34,300	96,700	1,300	1,900	26,200	87,900	2,700	2,900	3,900	3,800	200	300
Master's	16,900	52,900	600	1,600	13,300	44,700	400	700	2,500	5,800	100	100
Doctorate	9,800	70,900	200	1,500	7,500	58,200	200	1,200	1,900	9,800	-	200
Chemistry												
Bachelor's	19,600	46,700	500	800	13,900	41,000	1,800	2,600	3,400	2,100	-	300
Master's	6,100	14,800	400	100	4,300	11,600	100	500	1,300	2,500	-	100
Doctorate	4,000	22,600	100	700	2,800	16,700	100	500	1,000	4,800	-	-
Earth science												
Bachelor's	6,700	30,400	500	700	5,700	28,400	100	100	200	1,100	200	100
Master's	5,300	20,100	100	800	4,800	18,000	200	-	-	1,400	100	-
Doctorate	1,300	9,300	-	100	1,200	8,100	-	200	100	800	-	-
Physics												
Bachelor's	1,000	6,400	-	200	800	6,000	200	-	-	200	-	-
Master's	1,600	6,500	-	100	1,200	5,600	-	-	400	800	-	-
Doctorate	800	13,700	-	200	500	11,400	-	100	300	2,000	-	-
Other physical science												
Bachelor's	3,100	6,200	200	100	2,700	5,900	200	-	-	100	-	-
Master's	1,300	3,900	-	200	1,000	3,300	-	-	200	400	-	-
Doctorate	300	2,400	-	-	200	2,200	-	-	100	200	-	-
Postsecondary physical science												
Bachelor's	3,800	7,200	100	100	3,100	6,600	300	200	200	300	-	-
Master's	2,600	7,600	-	500	2,000	6,200	-	100	500	800	-	-
Doctorate	3,300	22,800	100	500	2,700	19,900	-	400	400	1,900	-	100
Social and related science	156,300	157,200	5,000	4,800	136,400	137,500	-	7,300	-	6,500	600	900
Bachelor's	32,000	29,600	1,000	1,100	25,700	25,100	3,600	2,200	1,600	1,000	100	200
Master's	81,300	56,700	2,900	1,800	72,700	50,000	3,400	2,800	2,000	1,800	200	200
Doctorate	43,000	70,900	1,100	1,900	38,000	62,400	1,900	2,300	1,700	3,700	300	500

See explanatory information and SOURCES at end of table.

Appendix table 5-22. Scientists and engineers in the U.S. labor force, by occupation, sex, race/ethnicity, and highest degree: 1995

Occupation and highest degree	Total		Hispanic		White		Black		Asian		American Indian	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
Economics												
Bachelor's	4,100	7,200	-	400	4,000	6,500	100	200	-	100	-	-
Master's	4,000	11,600	700	400	2,700	10,000	-	700	600	400	-	100
Doctorate	1,500	5,600	-	300	1,100	4,600	-	100	300	600	-	100
Political science												
Bachelor's	2,100	3,000	100	-	1,600	2,700	100	100	200	200	-	-
Master's	1,600	1,100	200	200	1,300	600	-	-	-	300	-	-
Doctorate	300	900	-	100	300	700	-	-	-	100	-	-
Psychology												
Bachelor's	16,800	9,100	700	400	13,000	7,400	2,100	800	1,000	200	-	200
Master's	60,300	29,600	1,600	600	55,500	27,000	2,200	1,500	800	300	200	100
Doctorate	22,800	25,600	500	600	20,700	24,000	900	500	400	500	100	100
Sociology												
Bachelor's	3,300	4,500	-	200	2,900	4,100	200	200	200	100	100	-
Master's	3,200	2,300	-	-	2,900	2,100	-	-	100	200	-	-
Doctorate	1,300	1,800	-	-	1,100	1,700	100	-	-	-	-	-
Other social science												
Bachelor's	1,800	2,000	100	-	1,500	1,400	200	400	-	100	-	-
Master's	2,200	2,700	-	-	1,900	2,500	100	100	100	100	-	-
Doctorate	1,400	1,600	100	100	1,100	1,400	200	-	100	100	-	-
Postsecondary social sciences												
Bachelor's	3,800	3,800	-	100	2,800	2,900	800	400	200	300	-	-
Master's	10,100	9,400	400	600	8,300	7,900	1,100	400	400	500	-	100
Doctorate	15,700	35,300	500	800	13,700	30,100	600	1,700	900	2,500	100	300
Engineering	118,600	1,254,200	4,800	38,000	91,000	1,056,200	8,100	27,700	14,400	128,500	200	3,100
Bachelor's	81,700	849,800	3,400	25,600	63,400	741,000	6,100	21,500	8,600	58,800	200	2,300
Master's	31,400	337,800	1,100	10,900	24,000	269,600	1,800	5,300	4,500	51,200	-	700
Doctorate	5,500	66,600	300	1,500	3,600	45,600	200	900	1,300	18,500	-	100
Aerospace engineering												
Bachelor's	2,900	41,000	100	1,700	2,400	35,700	300	900	100	2,500	-	200
Master's	1,500	25,300	-	1,100	1,200	21,500	200	300	200	2,200	-	-
Doctorate	200	4,200	-	100	100	3,100	-	-	-	1,000	-	-
Chemical engineering												
Bachelor's	6,300	40,300	300	1,300	4,500	34,500	600	1,200	900	3,300	-	-
Master's	2,200	17,700	-	600	1,700	14,600	200	400	200	2,200	-	-
Doctorate	900	5,500	-	100	700	3,700	-	100	100	1,600	-	-

See explanatory information and SOURCES at end of table.

Appendix table 5-22. Scientists and engineers in the U.S. labor force, by occupation, sex, race/ethnicity, and highest degree: 1995

Occupation and highest degree	Total		Hispanic		White		Black		Asian		American Indian	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
Civil engineering												
Bachelor's	14,000	131,700	400	4,900	11,100	113,700	400	2,500	2,000	10,300	-	300
Master's	4,100	48,600	300	1,800	2,800	37,000	200	500	800	9,300	-	100
Doctorate	300	3,600	-	100	100	2,000	-	100	200	1,400	-	-
Electrical engineering												
Bachelor's	16,400	233,400	800	8,100	10,900	195,000	1,700	7,600	2,900	22,000	-	800
Master's	6,300	98,400	200	3,500	4,000	75,200	600	1,900	1,600	17,600	-	100
Doctorate	500	13,400	-	300	100	8,600	-	100	300	4,400	-	-
Industrial engineering												
Bachelor's	7,100	46,800	300	1,400	5,500	41,200	800	2,400	500	1,600	-	200
Master's	2,400	14,700	-	300	2,100	12,600	100	100	100	1,500	-	100
Doctorate	100	800	-	-	100	500	-	-	-	200	-	-
Mechanical engineering												
Bachelor's	10,300	185,100	200	5,000	8,800	164,600	500	4,200	800	10,300	-	500
Master's	4,000	53,300	100	1,400	3,000	41,900	200	800	600	9,000	-	300
Doctorate	700	7,400	-	200	500	4,300	100	100	100	2,900	-	-
Other engineering												
Bachelor's	24,500	166,300	1,200	3,300	20,100	152,300	1,700	2,600	1,300	7,900	200	300
Master's	9,800	72,200	300	1,700	8,300	61,200	300	1,100	900	8,100	-	100
Doctorate	1,600	15,200	-	300	1,100	11,100	100	100	400	3,700	-	-
Postsecondary engineering												
Bachelor's	200	5,100	-	-	100	4,100	-	200	100	900	-	-
Master's	1,000	7,500	100	400	900	5,600	-	200	100	1,300	-	-
Doctorate	1,200	16,400	200	400	800	12,200	-	400	200	3,400	-	100

KEY: - = Fewer than 50 estimated.

NOTES: Because of rounding, details may not add up to totals. Total includes "professional and other degrees." Scientists and engineers are defined in terms of field of employment not degree field.

SOURCE: National Science Foundation/SRS 1995 SESTAT Integrated Data Files.

Appendix table 5-23. Employment status of scientists and engineers, by occupation, sex, and race/ethnicity: 1995

Occupation, sex, and race/ethnicity	Total	Full-time employed in field	Full-time employed outside field	Part-time employed	Not employed	Not in labor force
Science and engineering total	3,708,300	2,656,700	285,900	242,900	70,500	452,300
Women						
Hispanic	25,000	17,000	900	2,900	500	3,700
White, non-Hispanic	684,000	417,100	59,100	104,200	10,600	92,900
Black, non-Hispanic	44,600	31,700	4,200	4,200	1,100	3,500
Asian	79,300	57,200	7,300	5,600	2,200	7,000
American Indian	2,300	1,500	300	200	-	300
Other	300	200	-	-	-	100
Men						
Hispanic	77,000	60,600	5,400	3,300	2,000	5,600
White, non-Hispanic	2,454,900	1,801,300	187,100	104,800	44,000	317,700
Black, non-Hispanic	74,500	56,000	7,500	3,900	1,600	5,400
Asian	258,800	207,200	13,900	13,400	8,400	15,900
American Indian	6,300	5,400	200	400	100	200
Other	1,500	1,500	-	-	-	-
Computer and mathematics sciences						
Women						
Hispanic	6,900	4,800	800	400	-	800
White, non-Hispanic	253,600	141,600	48,000	31,000	3,300	29,800
Black, non-Hispanic	18,000	11,800	3,100	1,500	400	1,200
Asian	33,800	25,000	5,000	1,200	400	2,100
American Indian	700	500	100	100	-	100
Other	-	-	-	-	-	-
Men						
Hispanic	18,400	13,600	2,700	600	700	900
White, non-Hispanic	606,700	434,500	107,500	22,200	9,600	32,900
Black, non-Hispanic	24,000	18,200	3,900	700	400	800
Asian	73,200	58,900	6,800	3,300	1,800	2,400
American Indian	1,000	800	100	100	100	-
Other	700	700	-	-	-	-
Life and related sciences						
Women						
Hispanic	3,900	2,300	-	800	100	800
White, non-Hispanic	105,600	70,000	2,100	14,000	2,300	17,200
Black, non-Hispanic	5,600	3,900	-	300	-	1,400
Asian	14,600	10,500	400	1,300	500	1,900
American Indian	200	200	-	-	-	-
Other	200	200	-	-	-	100
Men						
Hispanic	6,600	5,000	200	300	200	1,000
White, non-Hispanic	200,400	153,800	6,400	10,900	2,400	26,900
Black, non-Hispanic	6,700	4,600	500	500	-	1,100
Asian	20,300	15,200	300	1,300	700	2,800
American Indian	500	400	-	-	-	-
Other	-	-	-	-	-	-
Physical and related sciences						
Women						
Hispanic	2,900	1,900	-	100	200	800
White, non-Hispanic	59,900	36,300	2,400	7,300	1,100	12,900
Black, non-Hispanic	3,300	2,600	200	200	100	-
Asian	9,300	6,900	-	900	500	1,100
American Indian	300	100	200	-	-	-
Other	-	-	-	-	-	-

See explanatory information and SOURCES at end of table.

Appendix table 5-23. Employment status of scientists and engineers, by occupation, sex, and race/ethnicity: 1995

Page 2 of 2

Occupation, sex, and race/ethnicity	Total	Full-time employed in field	Full-time employed outside field	Part-time employed	Not employed	Not in labor force
Men						
Hispanic	5,400	4,200	500	200	100	400
White, non-Hispanic	222,500	166,600	5,900	14,200	4,400	31,400
Black, non-Hispanic	5,900	4,100	400	300	100	1,000
Asian	20,800	16,200	700	1,700	900	1,400
American Indian	700	500	-	-	-	100
Other	-	-	-	-	-	-
Social and related sciences						
Women						
Hispanic	6,200	3,800	-	1,100	100	1,100
White, non-Hispanic	160,000	92,100	2,200	44,700	1,700	19,400
Black, non-Hispanic	9,600	6,600	300	2,000	100	700
Asian	5,900	3,700	-	1,500	100	600
American Indian	800	500	-	100	-	200
Other	-	-	-	-	-	-
Men						
Hispanic	5,400	3,400	300	1,100	200	300
White, non-Hispanic	158,600	118,400	2,700	17,900	1,600	18,000
Black, non-Hispanic	8,600	5,700	400	1,600	-	800
Asian	7,800	4,800	-	1,600	100	1,200
American Indian	900	800	-	100	-	-
Other	-	-	-	-	-	-
Engineering						
Women						
Hispanic	5,000	4,200	100	500	100	200
White, non-Hispanic	104,800	77,100	4,400	7,300	2,300	13,700
Black, non-Hispanic	8,200	6,800	600	200	500	200
Asian	15,600	11,100	1,800	600	800	1,200
American Indian	300	300	-	-	-	-
Other	41,200	34,500	1,800	1,200	800	3,000
Men						
Hispanic	1,266,700	927,900	64,600	39,700	26,000	208,500
White, non-Hispanic	29,300	23,400	2,400	900	1,000	1,700
Black, non-Hispanic	136,900	112,100	6,200	5,500	4,900	8,200
Asian	3,200	2,900	100	200	-	100
American Indian	800	800	-	-	-	-
Other	800	800	-	-	-	-

KEY: - = Fewer than 50 estimated.

NOTES: Because of rounding, details may not add up to totals.
Scientists and engineers are defined in terms of field of employment not degree field.

SOURCE: National Science Foundation/SRS 1995 SESTAT Integrated Data Files.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 5-24. Full-time doctoral scientists and engineers in 4-year colleges or universities, by academic rank, sex, and race/ethnicity: 1995

Page 1 of 1

Sex and academic rank	Total	White, non-Hispanic	Asian	Black, non-Hispanic	Hispanic	American Indian
Both sexes						
Total	170,400	141,500	19,700	3,900	4,600	700
Not applicable at this institution	2,600	2,100	400	-	100	-
Not applicable for my position	24,200	17,900	5,100	500	600	-
Professor	60,400	53,600	4,400	800	1,100	400
Associate professor	40,000	33,800	3,700	1,200	1,100	200
Assistant professor	34,800	27,600	4,400	1,200	1,400	100
Instructor	2,000	1,500	300	-	100	-
Lecturer	1,700	1,500	100	-	100	-
Adjunct faculty	2,200	1,800	300	-	-	-
Other	2,500	1,600	800	-	100	-
Women						
Total	35,700	29,600	3,600	1,100	1,200	100
Not applicable at this institution	400	400	100	-	-	-
Not applicable for my position	7,500	5,700	1,400	200	200	-
Professor	6,000	5,300	400	100	100	100
Associate professor	7,900	6,900	400	300	200	-
Assistant professor	11,000	8,900	1,000	500	500	100
Instructor	1,000	800	100	-	100	-
Lecturer	600	500	-	-	-	-
Adjunct faculty	700	600	100	-	-	-
Other	600	400	100	-	-	-
Men						
Total	134,700	111,900	16,000	2,800	3,300	600
Not applicable at this institution	2,100	1,700	300	-	100	-
Not applicable for my position	16,800	12,300	3,800	300	400	-
Professor	54,300	48,300	4,100	700	1,000	300
Associate professor	32,000	26,900	3,200	900	900	200
Assistant professor	23,800	18,700	3,400	800	900	-
Instructor	1,000	700	200	-	-	-
Lecturer	1,100	1,000	100	-	-	-
Adjunct faculty	1,500	1,200	300	-	-	-
Other	1,900	1,200	700	-	100	-

KEY: - = Fewer than 50 estimated.

NOTES: Because of rounding, details may not add up to totals. Total includes "other" race/ethnicity. Scientists and engineers are defined in terms of field of employment not degree field.

SOURCE: National Science Foundation/SRS 1995 SESTAT Integrated Data Files.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 5-25. Full-time doctoral scientists and engineers in 4-year colleges or universities, by sex, race/ethnicity, and tenure: 1995

Page 1 of 1

Sex and tenure	Total	White, non-Hispanic	Asian	Black, non-Hispanic	Hispanic	American Indian
Both sexes						
Total	170,400	141,500	19,600	3,900	4,500	700
No tenure system at this institution	5,800	4,400	1,000	100	200	-
No tenure system for my position	26,600	20,400	5,000	500	700	-
Tenured	91,800	80,600	6,900	1,800	1,900	500
On tenure track but not tenured	30,700	24,100	3,900	1,200	1,400	100
Not on tenure track	15,500	12,000	2,900	200	400	-
Women						
Total	35,700	29,600	3,600	1,100	1,200	100
No tenure system at this institution	1,100	900	200	-	-	-
No tenure system for my position	8,000	6,300	1,200	200	300	-
Tenured	12,500	11,100	600	400	300	100
On tenure track but not tenured	8,900	7,200	800	400	500	-
Not on tenure track	5,200	4,100	800	100	200	-
Men						
Total	134,700	111,900	16,000	2,800	3,300	600
No tenure system at this institution	4,700	3,600	800	100	200	-
No tenure system for my position	18,600	14,100	3,800	300	400	-
Tenured	79,300	69,500	6,300	1,400	1,600	500
On tenure track but not tenured	21,800	16,900	3,100	800	900	-
Not on tenure track	10,300	7,800	2,000	200	200	-

KEY: - = Fewer than 50 estimated.

NOTES: Because of rounding, details may not add up to totals. Total includes "other" race/ethnicity. Scientists and engineers are defined in terms of field of employment not degree field.

SOURCE: National Science Foundation/SRS 1995 SESTAT Integrated Data Files.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 5-26. Scientists and engineers employed in business or industry, by sex, race/ethnicity, and primary work activity: 1995

Page 1 of 1

Primary work activity and sex	Total	Race/ethnicity					
		White, non-Hispanic	Asian	Black, non-Hispanic	Hispanic	American Indian	Other
Total	1,849,800	1,558,700	186,400	51,700	48,900	3,800	100
Women	333,500	268,200	38,900	17,000	8,600	700	-
Men	1,516,300	1,290,500	147,500	34,700	40,300	3,100	100
Reseach and development							
Women	92,700	71,100	13,200	5,500	2,600	300	-
Men	606,400	515,900	61,500	11,300	16,000	1,500	100
Teaching							
Women	4,700	4,500	-	100	100	-	-
Men	6,200	5,300	400	300	100	100	-
Management and administration							
Women	60,100	50,000	5,100	2,900	1,800	200	-
Men	331,200	293,200	20,500	8,200	8,700	600	-
Computer applications							
Women	127,600	101,100	17,200	6,100	3,100	200	-
Men	410,700	337,700	50,200	11,600	10,300	800	-
Other							
Women	48,500	41,500	3,300	2,500	1,000	100	-
Men	161,800	138,400	14,900	3,200	5,100	200	-

KEY: - = Fewer than 50 estimated.

NOTES: Because of rounding, details may not add up to totals. Scientists and engineers are defined in terms of field of employment not degree field.

SOURCE: National Science Foundation/SRS 1995 SESTAT Integrated Data Files.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 5-27. Median annual salaries of full-time employed scientists and engineers, by occupation, age, sex, and race/ethnicity: 1995

Occupation and age	Women					Men				
	White, non-Hispanic	Asian	Black, non-Hispanic	Hispanic	American Indian	White, non-Hispanic	Asian	Black, non-Hispanic	Hispanic	American Indian
Science and engineering total										
20-29	$31,000	$34,000	$33,000	$28,500	$31,000	$36,000	$40,000	$36,000	$36,000	$34,000
30-39	43,000	45,000	43,000	39,000	35,000	50,000	50,000	47,000	47,000	48,000
40-49	47,692	45,000	47,500	41,000	48,000	58,800	59,000	48,900	54,000	49,000
50 or older	49,344	48,000	34,000	50,000	58,000	62,000	60,000	54,000	60,000	61,000
Computer and mathematics sciences										
20-29	38,000	38,500	32,000	-	-	38,600	43,000	36,000	35,000	-
30-39	45,000	48,000	41,000	40,000	-	50,000	54,000	49,200	48,000	-
40-49	50,000	50,000	48,000	-	-	59,000	59,000	48,900	55,000	-
50 or older	50,000	47,400	-	-	-	60,000	59,000	53,000	54,000	-
Life and related sciences										
20-29	20,000	26,000	-	-	-	21,000	15,000	-	-	-
30-39	33,000	28,800	27,800	32,000	-	39,500	30,000	31,000	36,000	-
40-49	45,000	38,000	36,300	29,000	-	48,500	51,300	48,000	43,000	-
50 or older	43,400	50,000	33,000	-	-	60,000	65,000	41,300	43,500	-
Physical and related sciences										
20-29	29,000	29,500	-	-	-	25,000	25,000	-	16,000	-
30-39	40,000	45,000	45,000	38,900	-	42,500	40,000	43,000	35,000	-
40-49	46,000	43,000	-	-	-	57,800	50,000	45,000	52,000	-
50 or older	44,900	46,100	-	-	-	65,000	55,000	47,000	60,000	-
Social and related sciences										
20-29	23,000	-	-	16,000	-	25,000	-	-	-	-
30-39	35,500	45,000	34,200	35,000	-	39,000	40,000	49,900	40,000	-
40-49	41,500	45,000	37,800	42,500	-	48,600	55,000	35,000	48,000	-
50 or older	47,400	53,700	29,000	50,000	-	59,000	56,000	63,000	53,000	-
Engineering										
20-29	38,800	37,700	42,000	40,000	-	38,000	39,000	40,000	40,000	37,800
30-39	49,600	50,000	49,100	49,700	-	52,000	50,000	48,000	49,000	48,000
40-49	52,000	48,000	-	-	-	60,000	60,000	58,000	58,600	-
50 or older	60,000	51,000	-	-	-	64,000	60,000	62,000	65,000	-

KEY: - = Fewer than 20 individuals reporting salary.

NOTES: Because of rounding, details may not add up to totals. Total includes "other" race/ethnicity. Scientists and engineers are defined in terms of field of employment not degree field.

SOURCE: National Science Foundation/SRS 1995 SESTAT Integrated Data Files.

Table 5-28. U.S. population and scientists and engineers, by type of disability: 1995

Page 1 of 1

U.S. population 15-64 years old			Scientists and engineers		
Disability status and type	Number (in thousands)	Percent	Disability status and type	Number	Percent
Total population 15-64 years old	171,112	100.0	Total scientists and engineers	3,708,400	100.0
Having difficulty:	31,061	18.2	Moderate or severe difficulty or unable to do:	235,300	6.3
Seeing words and letters	4,163	2.4	Seeing words and letters	87,100	2.3
Hearing normal conversation	4,702	2.7	Hearing normal conversation	110,100	3.0
Having speech understood	1,242	0.7			
Lifting and carrying 10 pounds	8,219	4.8	Lifting and carrying 10 pounds	59,000	1.6
Climbing stairs without resting	8,758	5.1			
Walking 3 city blocks	8,934	5.2	Walking without assistance or using stairs	50,700	1.4

NOTES: Because of rounding, details may not add up to totals. Scientists and engineers are defined in terms of field of employment not degree field.

SOURCE: National Science Foundation/SRS 1995 SESTAT Integrated Data Files.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 5-29. Scientists and engineers with disabilities who are in the labor force, by age at onset of disability: 1995

Page 1 of 1

Age at onset	Number	Percent
Total	160,800	100.0
Since birth	11,100	6.9
Younger than 10	14,400	9.0
10 to 19	22,300	13.9
20 to 29	26,700	16.6
30 to 39	24,100	15.0
40 to 49	39,800	24.8
50 or older	22,400	13.9

NOTES: Because of rounding, details may not add up to totals.
Scientists and engineers are defined in terms of field of employment not degree field.

SOURCE: National Science Foundation/SRS 1995 SESTAT Integrated Data Files.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 5-30. Employment status of scientists and engineers, by age and disability status: 1995

Page 1 of 1

Age and disability status	Employment status: Total	Full-time employed in field	Full-time employed outside field	Part-time employed	Not employed	Not in labor force
All ages						
Persons without disabilities	3,473,100	2,534,600	268,900	227,700	64,100	377,800
Persons with disabilities	235,300	122,100	17,000	15,300	6,500	74,500
Younger than 35						
Persons without disabilities	1,030,000	811,000	57,100	89,900	15,300	56,700
Persons with disabilities	21,700	16,900	1,400	1,400	600	1,500
35 to 44						
Persons without disabilities	1,102,800	887,900	105,200	53,100	17,400	39,300
Persons with disabilities	44,100	34,600	3,100	1,600	1,500	3,200
45 to 54						
Persons without disabilities	714,300	569,500	77,900	33,900	14,400	18,600
Persons with disabilities	62,000	43,200	9,200	3,200	2,000	4,400
55 or older						
Persons without disabilities	626,000	266,300	28,700	50,800	17,000	263,100
Persons with disabilities	107,500	27,400	3,300	9,000	2,400	65,400
Percentage distribution:						
Younger than 35						
Persons without disabilities	100.0	78.7	5.5	8.7	1.5	5.5
Persons with disabilities	100.0	77.9	6.5	6.5	2.8	6.9
35 to 44						
Persons without disabilities	100.0	80.5	9.5	4.8	1.6	3.6
Persons with disabilities	100.0	78.5	7.0	3.6	3.4	7.3
45 to 54						
Persons without disabilities	100.0	79.7	10.9	4.7	2.0	2.6
Persons with disabilities	100.0	69.7	14.8	5.2	3.2	7.1
55 or older						
Persons without disabilities	100.0	42.5	4.6	8.1	2.7	42.0
Persons with disabilities	100.0	25.5	3.1	8.4	2.2	60.8

NOTE: Because of rounding, details may not add to totals. Scientists and engineers are defined in terms of field of employment not degree field.

SOURCE: National Science Foundation/SRS. 1995 SESTAT Integrated Data Files.

Women, Minorities, and Persons With Disabilites in Science and Engineering: 1998

Appendix table 5-31. Scientists and engineers in the U.S. labor force, by occupation, disability status, and highest degree: 1995

Page 1 of 1

Occupation	All degrees		Bachelor's		Master's		Doctorate	
	Persons without disabilities	Persons with disabilities	Persons without disabilities	Persons with disabilities	Persons without disabilities	Persons with disabilities	Persons without disabilities	Persons with disabilities
Total science and engineering	3,095,300	160,800	1,793,000	90,400	867,700	48,100	405,100	20,600
Computer and mathematics sciences	918,000	48,200	604,500	30,800	258,400	15,200	52,400	2,200
Computer and information science	812,600	42,200	575,000	30,200	213,300	11,100	21,700	900
Mathematical science	36,700	1,800	16,200	400	13,100	1,200	7,400	300
Postsecondary mathematics	68,700	4,300	13,200	300	32,000	2,900	23,300	1,100
Life and related sciences	299,200	12,300	120,000	3,900	62,600	2,600	99,500	4,900
Agricultural/food sciences	42,000	2,200	23,300	1,600	9,500	-	9,000	600
Biological science	167,400	5,500	69,900	1,300	32,000	1,600	57,000	2,400
Environmental science	19,700	900	13,100	800	5,800	-	800	100
Postsecondary life sciences	70,100	3,700	13,600	200	15,300	1,000	32,700	1,800
Physical and related sciences	267,300	14,400	124,500	6,500	65,000	4,800	77,500	3,100
Chemistry	108,000	5,900	62,700	3,500	19,400	1,500	25,800	900
Earth sciences	70,300	2,800	35,600	1,500	24,500	900	10,200	400
Physics	28,000	2,000	6,600	800	7,500	600	13,900	600
Other physical sciences	16,900	300	9,200	100	5,000	200	2,700	100
Postsecondary physics	44,100	3,400	10,400	600	8,600	1,600	24,900	1,100
Social and related sciences	301,900	19,500	58,300	3,300	129,700	8,300	106,700	7,200
Economics	33,000	1,200	10,800	500	15,400	200	6,700	400
Political science	8,900	100	5,100	-	2,700	-	1,100	100
Psychology	157,100	11,900	23,800	2,100	83,300	6,500	45,800	2,500
Sociology	15,000	1,400	7,200	600	4,900	600	2,900	100
Other social sciences	12,500	200	3,800	-	4,900	-	2,900	200
Postsecondary social sciences	75,500	4,800	7,600	-	18,600	1,000	47,200	3,800
Engineering	1,308,900	66,300	885,700	45,900	352,000	17,200	69,000	3,100
Aerospace engineering	71,700	3,500	41,300	2,600	26,000	800	4,200	100
Chemical engineering	70,200	2,800	45,000	1,600	18,900	1,000	6,300	200
Civil engineering	190,500	12,500	137,900	7,900	48,700	4,100	3,500	400
Electrical engineering	353,300	16,300	238,400	11,400	100,700	4,100	13,000	800
Industrial engineering	67,300	4,600	50,000	3,900	16,500	600	800	100
Mechanical engineering	252,200	9,100	188,200	7,200	55,500	1,800	8,000	100
Other engineering	274,300	15,600	180,000	10,800	77,900	4,100	16,200	600
Postsecondary engineering	29,500	2,000	4,900	500	7,800	700	16,800	900

KEY: - = Fewer than 50 estimated.

NOTES: Because of rounding, details may not add to totals. Total includes "professional or other degrees." Scientists and engineers are defined in terms of field of employment not degree field.

SOURCE: National Science Foundation/SRS 1995 SESTAT Integrated Data Files.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

Appendix table 5-32. Median annual salaries of full-time employed scientists and engineers, by highest degree, occupation, disability status, and age: 1995

Page 1 of 1

Occupation and age	Bachelor's		Master's		Doctorate	
	Persons without disabilities	Persons with disabilities	Persons without disabilities	Persons with disabilities	Persons without disabilities	Persons with disabilities
Science and engineering total						
20 to 29	$35,000	$37,000	$38,500	$23,000	$38,000	-
30 to 39	48,000	47,800	51,000	49,000	49,000	49,000
40 to 49	55,000	51,000	58,000	48,800	60,000	55,000
50 or older	59,856	55,000	60,000	60,000	65,400	65,000
Computer and mathematical sciences						
20 to 29	37,000	-	42,000	-	40,000	-
30 to 39	48,000	47,000	55,000	-	55,000	49,000
40 to 49	55,000	48,000	59,000	49,000	58,000	66,000
50 or older	56,000	46,700	58,000	50,000	63,500	59,000
Life and related sciences						
20 to 29	20,000	-	24,000	-	27,000	-
30 to 39	34,500	-	35,000	-	36,000	35,000
40 to 49	40,000	-	44,000	-	57,700	53,800
50 or older	46,200	-	43,400	-	65,000	70,000
Physical and related sciences						
20 to 29	27,000	-	25,700	-	37,000	-
30 to 39	40,000	-	42,000	-	50,000	55,000
40 to 49	47,000	-	56,900	-	62,500	62,000
50 or older	55,000	-	58,000	-	70,400	68,900
Social and related sciences						
20 to 29	21,000	-	26,000	-	42,000	-
30 to 39	31,000	-	35,000	-	43,000	40,000
40 to 49	34,000	-	40,000	-	52,000	48,000
50 or older	46,000	-	48,000	-	60,000	55,000
Engineering						
20 to 29	38,000	41,000	42,000	-	49,900	-
30 to 39	50,000	52,000	55,000	58,000	59,000	58,800
40 to 49	57,000	61,000	63,000	60,000	70,000	63,000
50 or older	61,000	60,000	66,000	70,000	76,000	74,000

KEY: - = Fewer than 50 estimated.

NOTES: Because of rounding, details may not add up to totals. Median salaries were not computed with fewer than 20 individuals reporting salary. Scientists and engineers are defined in terms of field of employment not degree field.

SOURCE: National Science Foundation/SRS 1995 SESTAT Integrated Data Files.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998

NATIONAL SCIENCE FOUNDATION
ARLINGTON, VA 22230

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE $300

RETURN THIS COVER SHEET TO ROOM P35 IF YOU DO NOT WISH TO RECEIVE THIS MATERIAL ☐, OR IF CHANGE OF ADDRESS IS NEEDED ☐, INDICATE CHANGE INCLUDING ZIP CODE ON THE LABEL (DO NOT REMOVE LABEL).

NSF 99-338
(Replaces NSF 96-311)

NOTICE

REPRODUCTION BASIS

- [ ] This document is covered by a signed "Reproduction Release (Blanket) form (on file within the ERIC system), encompassing all or classes of documents from its source organization and, therefore, does not require a "Specific Document" Release form.

- [x] This document is Federally-funded, or carries its own permission to reproduce, or is otherwise in the public domain and, therefore, may be reproduced by ERIC without a signed Reproduction Release form (either "Specific Document" or "Blanket").

EFF-089 (9/97)